

## **2018 IHSF Global Safety Survey Results**

**Executive Summary:** Participation in the International Helicopter Safety Foundation's (IHSF) fourth, global safety survey in 2018 was 76% higher than in 2017. Overall use of the IHSF's key recommendations in 2018 was 62% - up from 59% in 2017 and 42% in 2016. Helicopter operators with nearly all types of operator certificates and using helicopters for nearly all purposes showed significantly more use of the key safety recommendations. Personal/private operators still report the lowest use of the IHSF's key safety recommendations, and they remain the focus of the IHSF's ongoing safety promotion efforts

**Survey and Report Purposes:** This report describes the results and conclusions that may be drawn from the IHSF's fourth, global safety survey. Repeating the process done in three prior years, the IHSF promoted a global helicopter safety survey throughout 2018 to judge awareness and use of its products. In addition to promoting the IHSF's work, the survey is intended to measure how broadly the IHSF's key recommendations are being used. The increased survey participation in 2018, together with the results from prior years is showing a clear correlation between adoption of the IHSF's recommendations and helicopter safety. The results clearly show that the IHSF needs to focus its efforts on personal/private operators.

**Survey Participation:** Thanks to strong promotion by IHSF supporters, including the US Federal Aviation Administration (FAA), the European Aviation Safety Agency (EASA), Helicopter Association International (HAI) the European Helicopter Association (EHA), and the major helicopter manufacturers, participation in the 2018 increased by 76%. There were 1293 responses to the survey from 112 different countries in 2018. In 2017, there were 729 responses from 60 different countries. Whereas operators in the USA provided 307 responses in 2017 (69% of the total), responses from the USA dropped to 273 (38% of the total) in 2018. Responses from most other countries increased and there were responses from almost twice as many countries as in 2017.

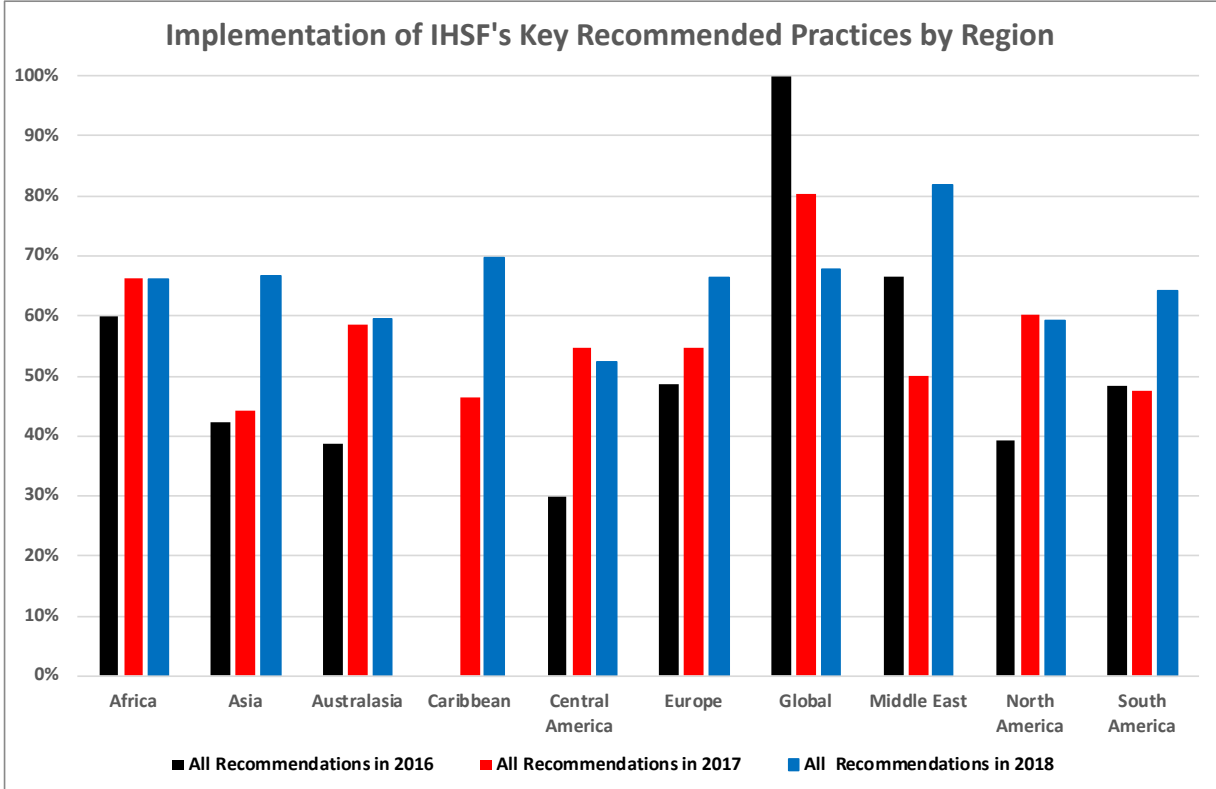
**Key Safety Recommendations:** The IHSF's regional teams have analyzed over 1,000 helicopter accidents and concluded that the following four areas offer the best opportunities to prevent helicopter accidents:

1. Safety Management Systems (SMS)
2. Structured programs for initial and recurrent training
3. Mission-specific systems and equipment, including:
  - a. Health & usage monitoring systems (HUMS)
  - b. Flight data monitoring (FDM) programs
  - c. Night vision goggles
  - d. Wire strike protection
4. Structured programs to fully comply with manufacturers' recommended maintenance practices

The IHSF and many other industry stakeholder groups are actively urging operators of all types to adopt these practices. The IHSF’s global safety survey is intended to assess the progress toward full implementation of these practices within each industry sector in every region. While some of the recommended systems and equipment have mission specific application, the other recommendations for SMS, training and maintenance practices are universally applicable.

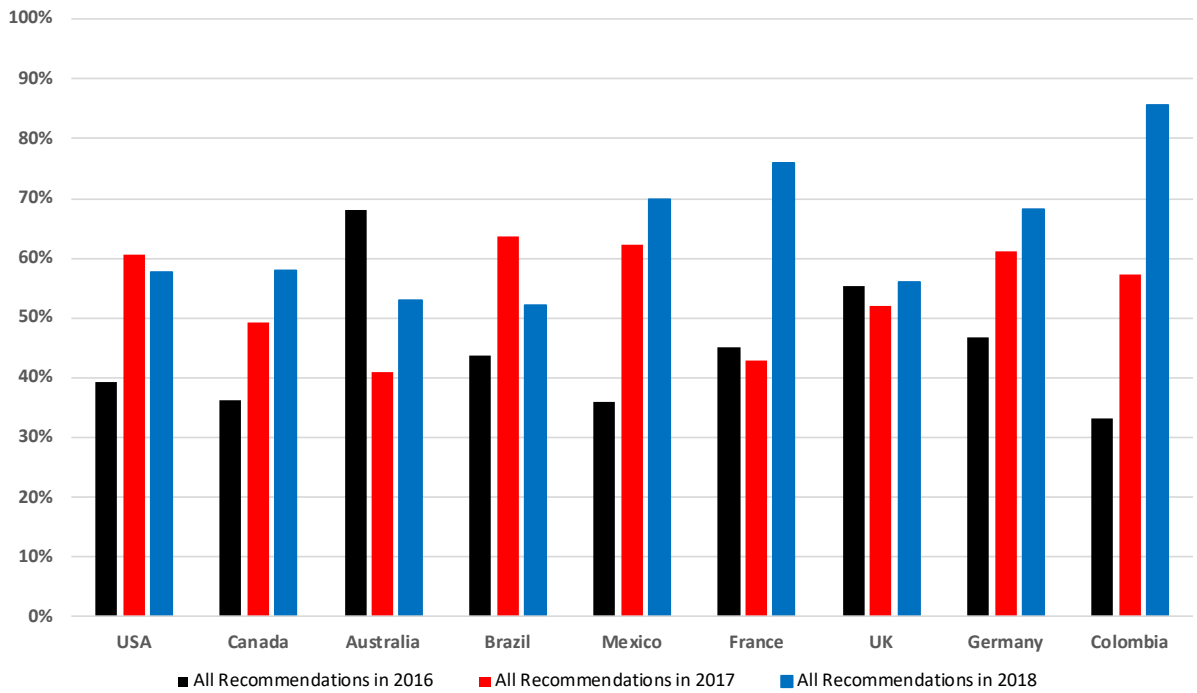
**Results:** The following charts show the overall survey results by region, by country (for the countries with greatest number of responses), by operator type and by helicopter use. Each chart shows the percentage of survey responses indicating that the IHSF recommendations have been adopted.

The survey questionnaire and supporting text is at Appendix 1. A detailed set of charts showing survey results by type of helicopter use is provided in Appendix 2. In all surveys conducted so far, the responses by country are generally in proportion to the number of helicopters in those countries.

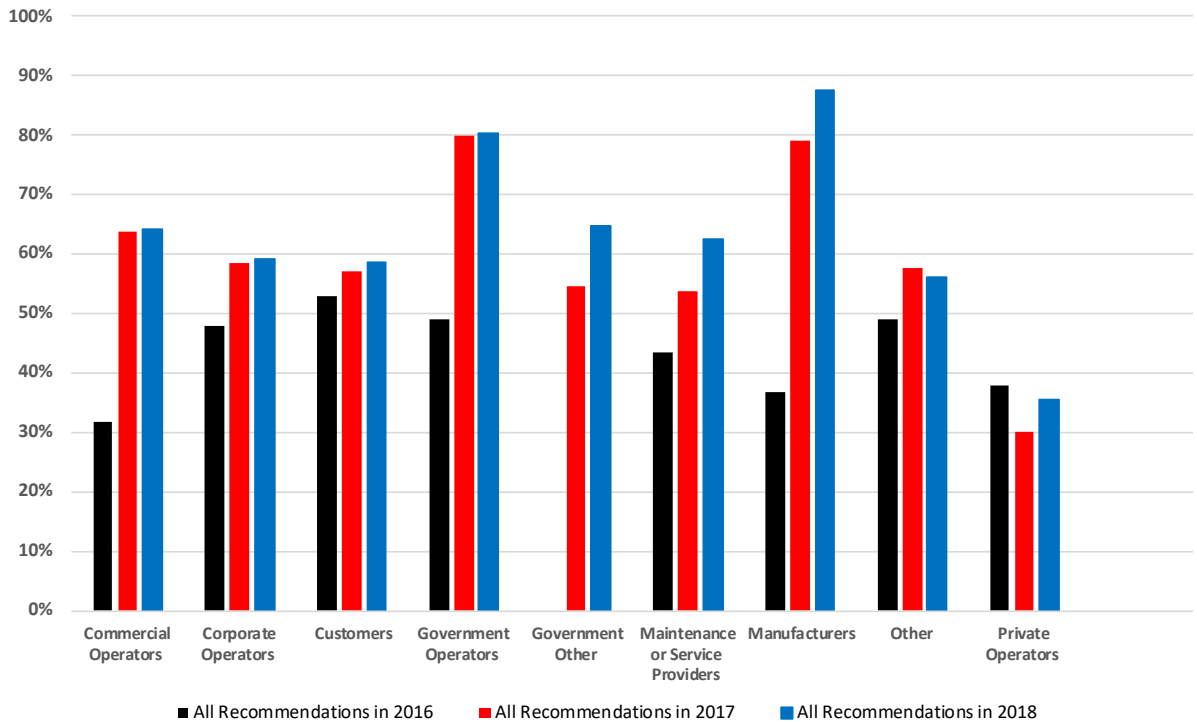


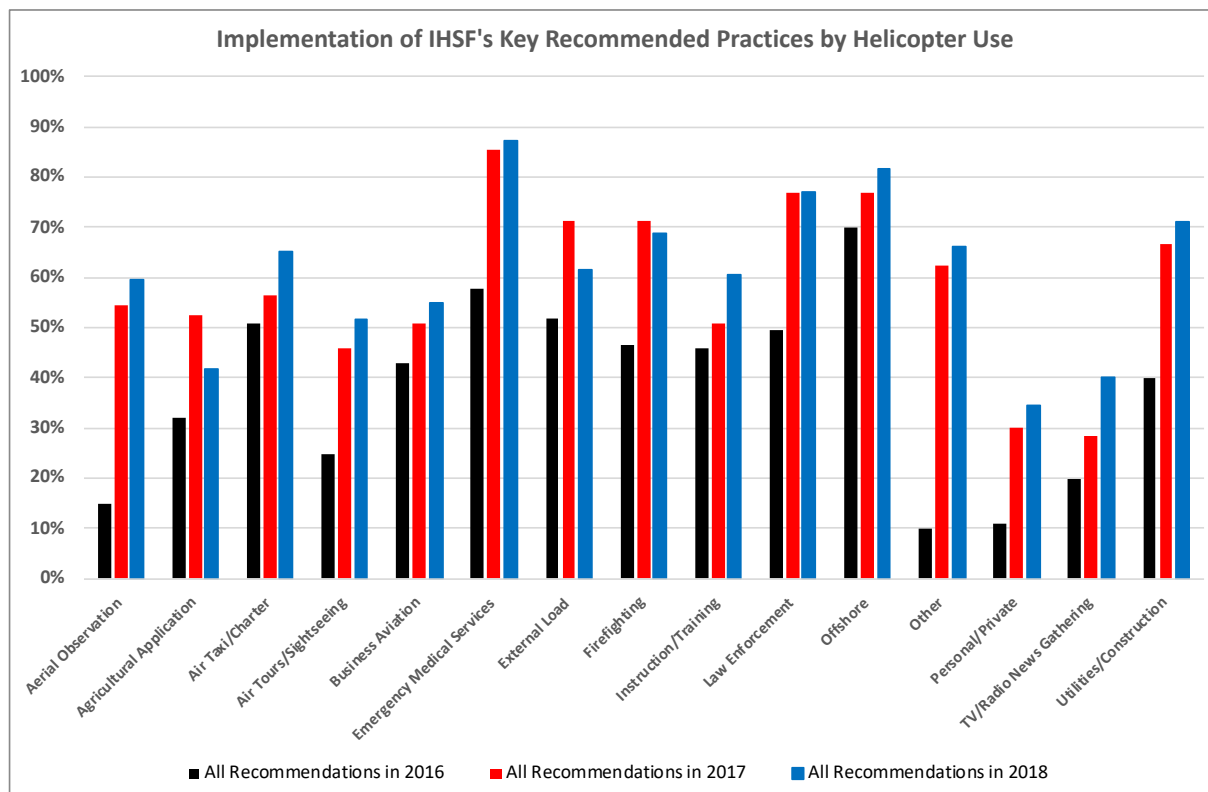
### Implementation of IHSF's Key Recommended Practices by Country

Countries Listed by Number of Survey Responses



### Implementation of IHSF's Key Recommended Practices by Operator Type

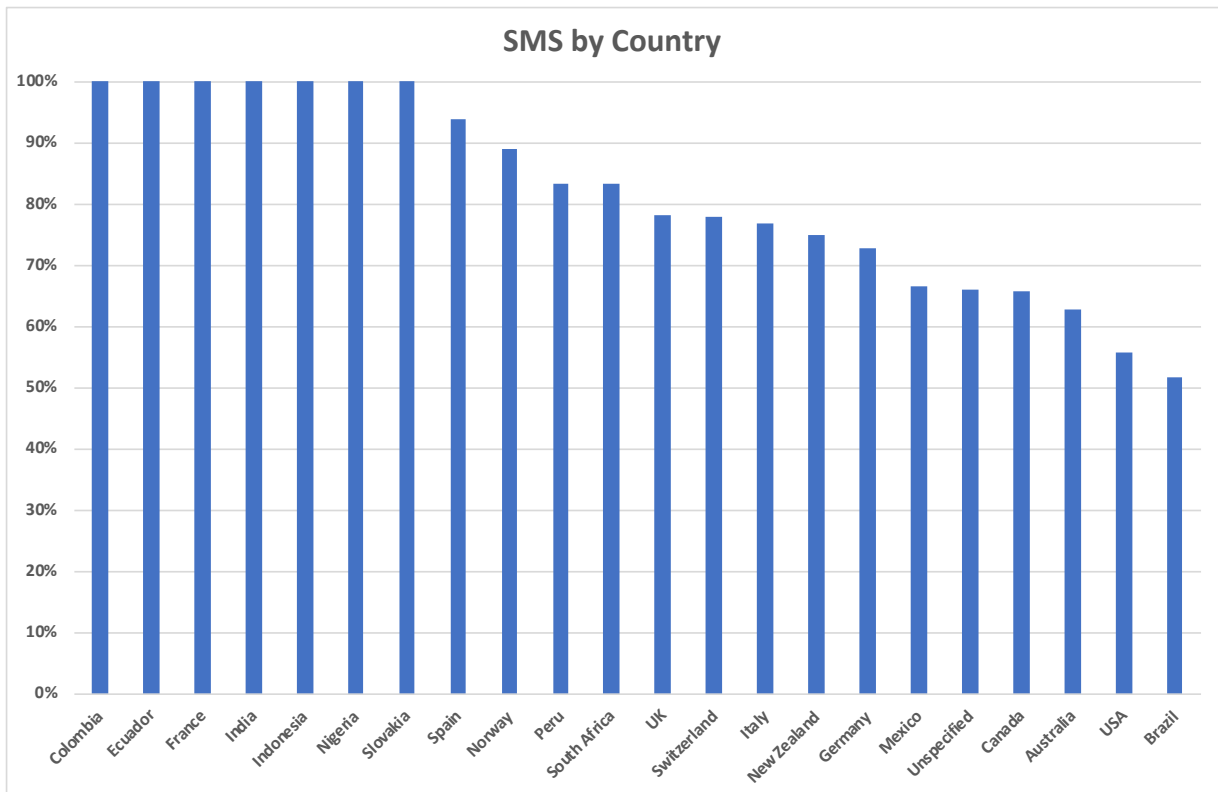
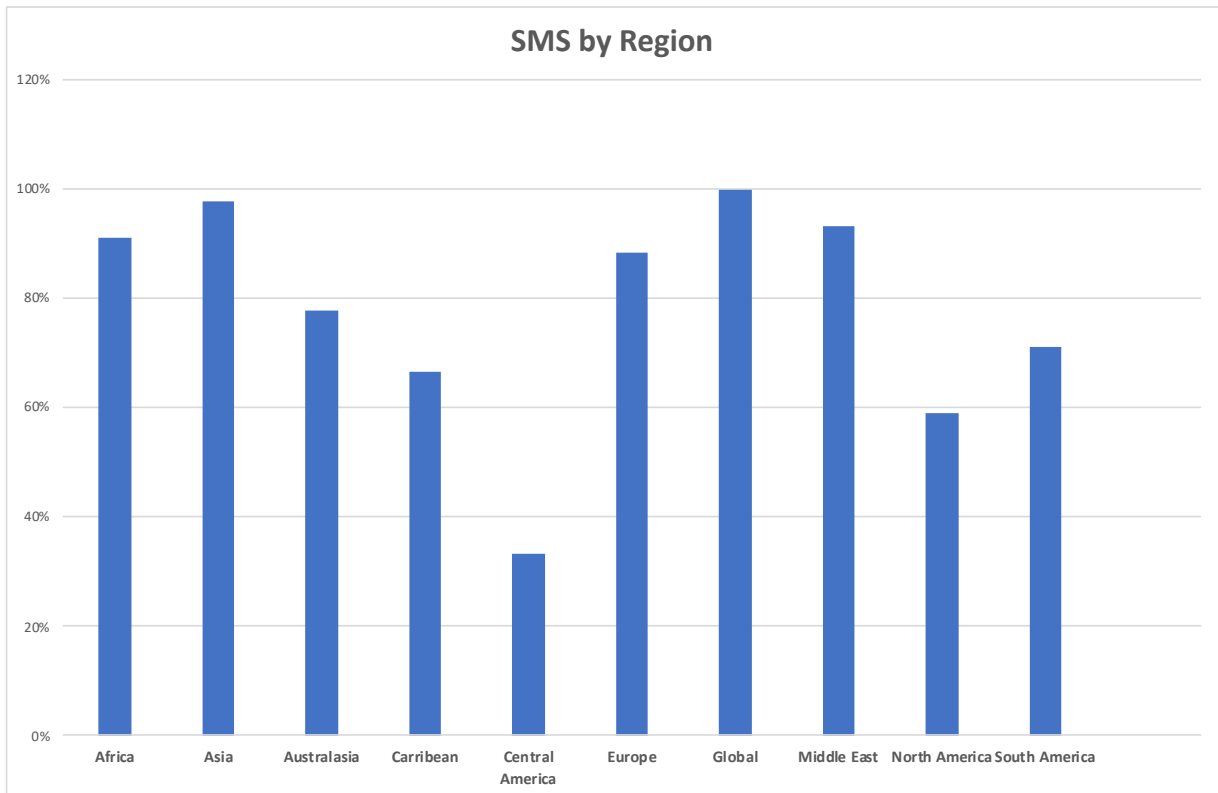


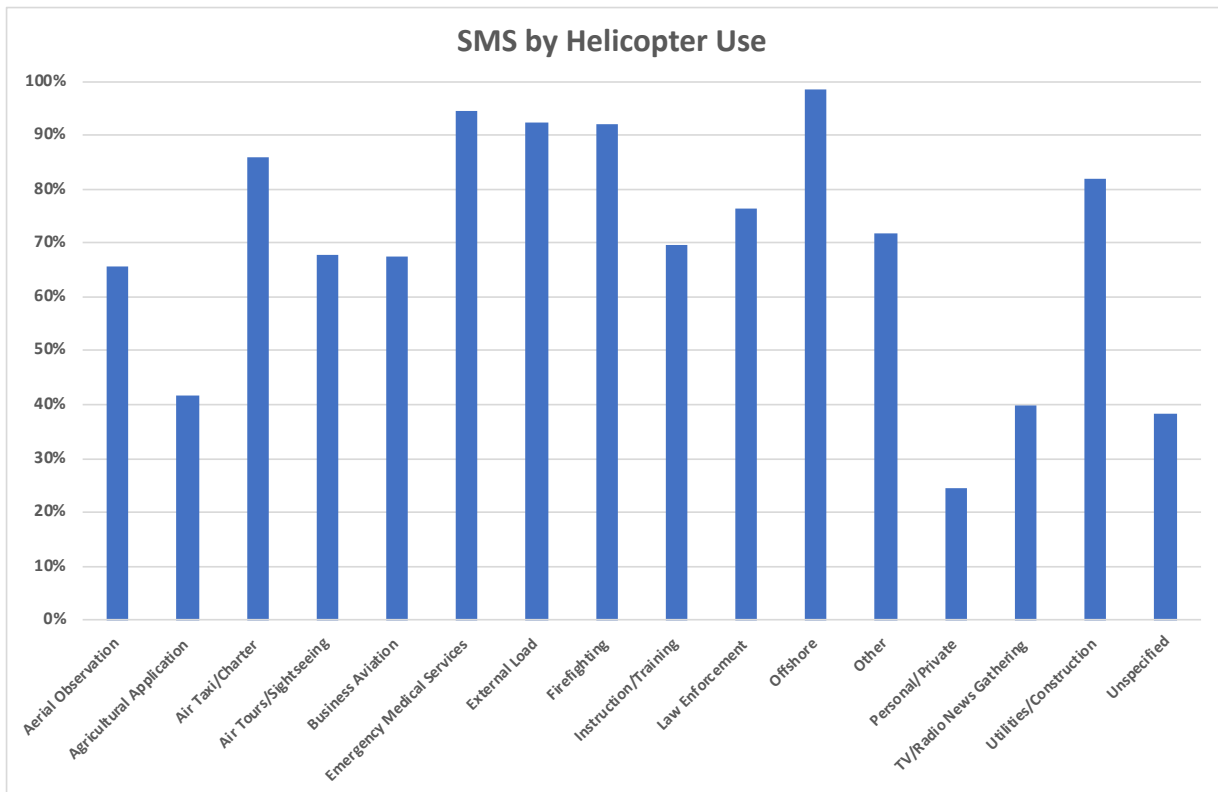
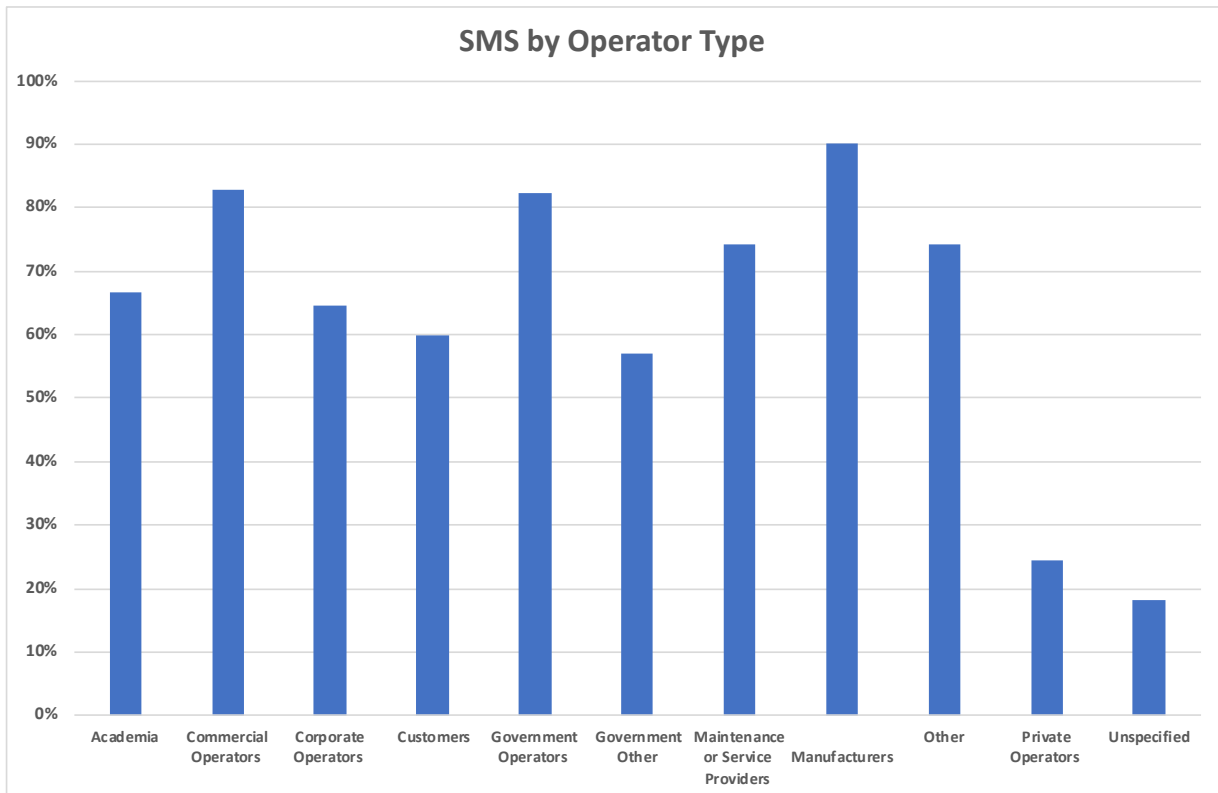


As reported last year, the most fundamental of the IHSF's recommendations, which supports all of the other recommendations, is for safety management systems (SMS). Sadly, many personal/private operators believe that SMS is only for big companies with lots of helicopters. The truth is that SMSs can and should be developed for any size operation, including individual owner/operators. An SMS is simply a structured and systematic way of assuring that all significant risks have been identified and are being managed to a level as low as reasonably practicable. For the individual owner/operator, the SMS should, among other things, assure that the helicopter's maintenance is being carried out in accord with manufacturer's recommendations, that the pilot is getting the appropriate check rides and training to assure ongoing competency, and that a pre-flight risk assessment is done before every flight. Several versions of SMS toolkits and other safety management materials are available for free download at <http://www.ihsf.aero/Default.aspx?tabid=3053&language=en-US>.

An SMS is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. The key elements of an SMS are (1) Policy and Objectives, (2) Risk Management, (3) Assurance, and (4) Promotion. An SMS should be structured, documented and carried out in a fit-for-purpose way to assure that all risks are assessed and then continuously managed to a level as low as reasonably practicable.

The charts on the following pages show the 2018 survey results for SMS use.



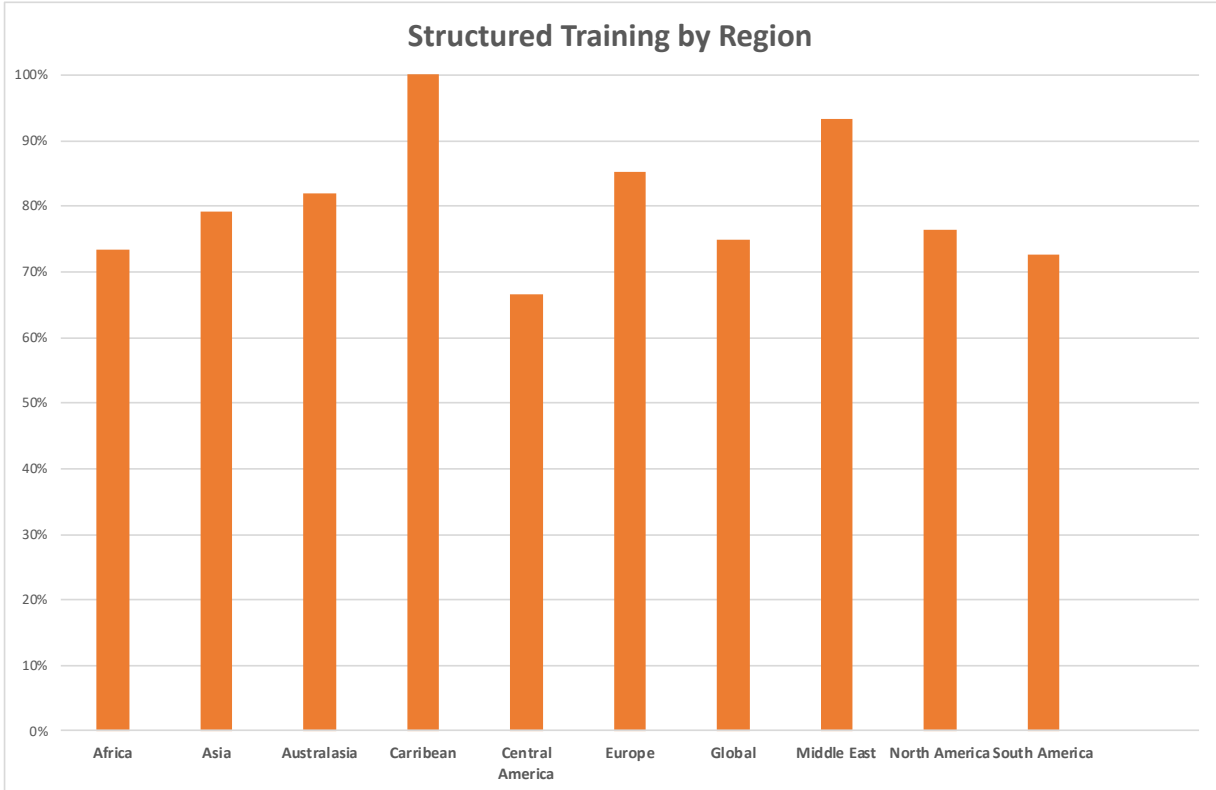


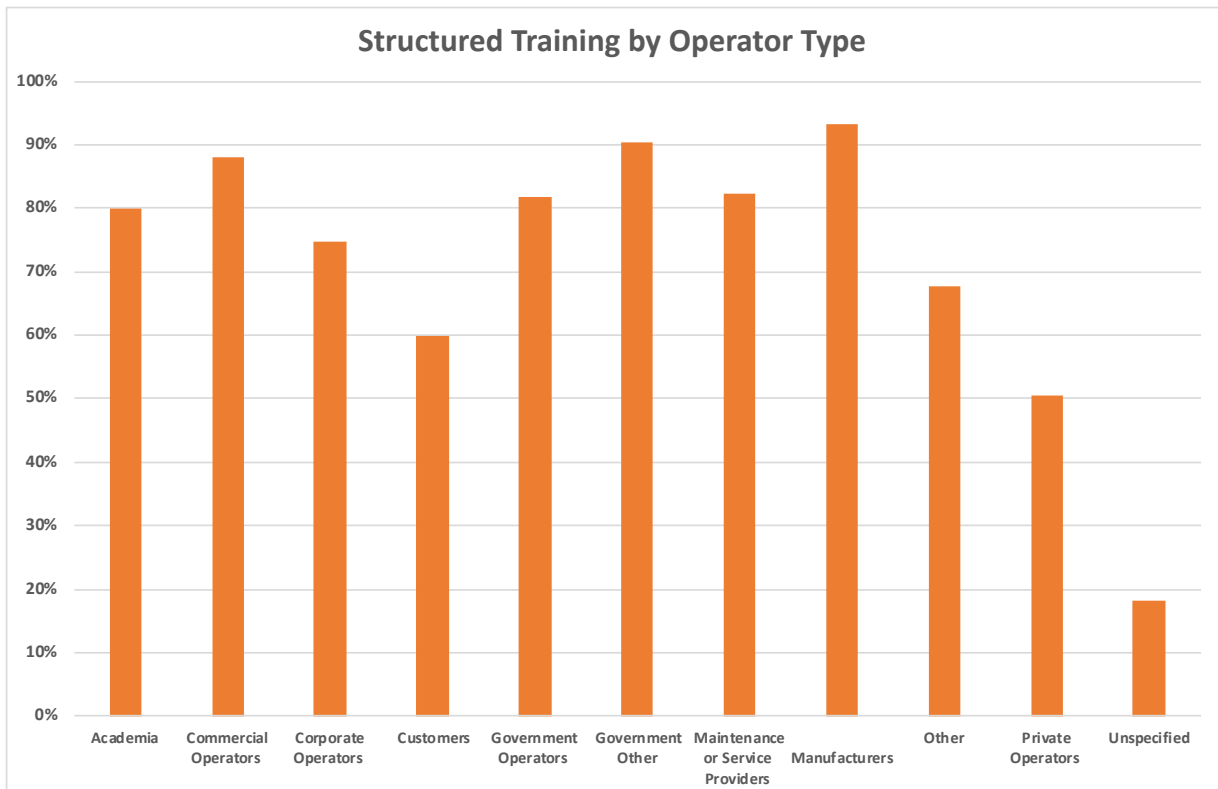
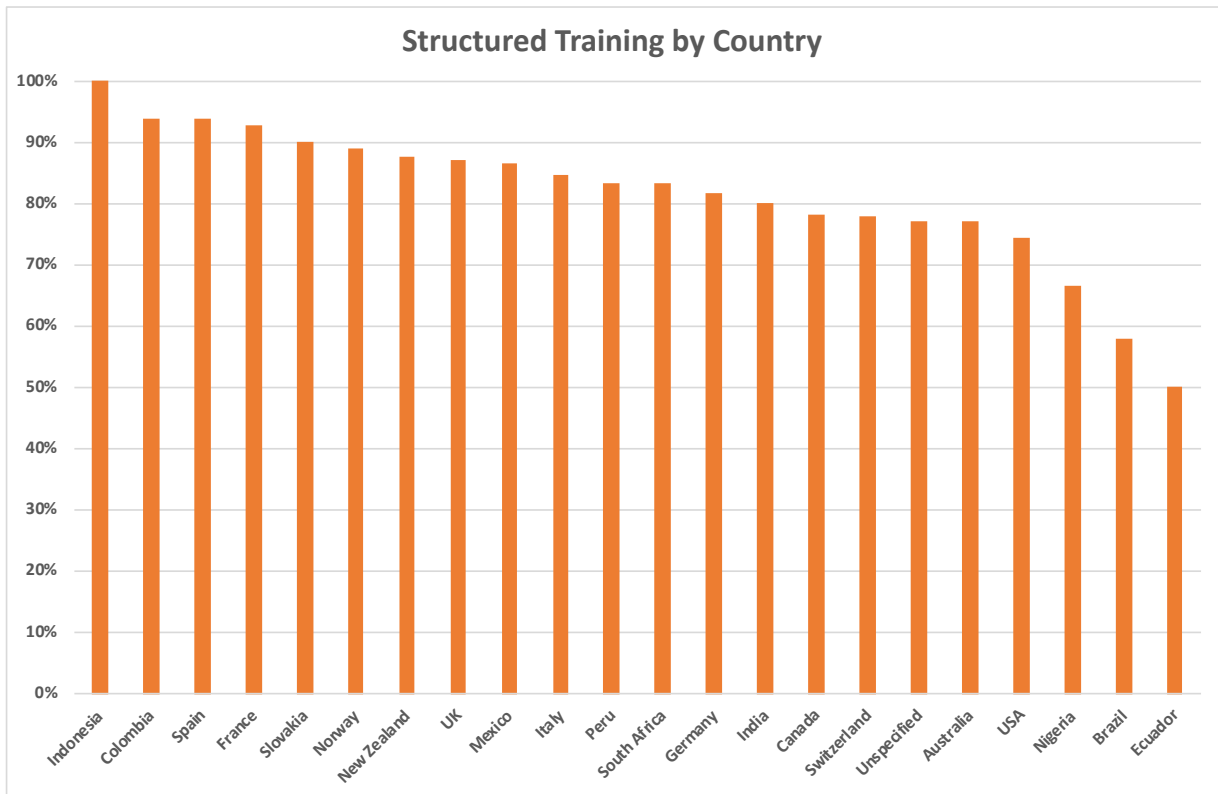
In addition to the IHSF's concern for the limited use of SMS by personal/private operators, there is concern for operators using helicopters for agricultural application and for TV/radio news gathering, where there is also low use of SMS and a history of relatively high accident rates.

After SMS, the next recommendation that can do the most good is training. The IHSF's free training toolkit, based on lessons learned from accident analyses, offers guidance for all helicopter operators to develop and maintain effective training programs. You can find the training toolkit and other training materials at <http://www.ihsf.aero/Default.aspx?tabid=3048&language=en-US>.

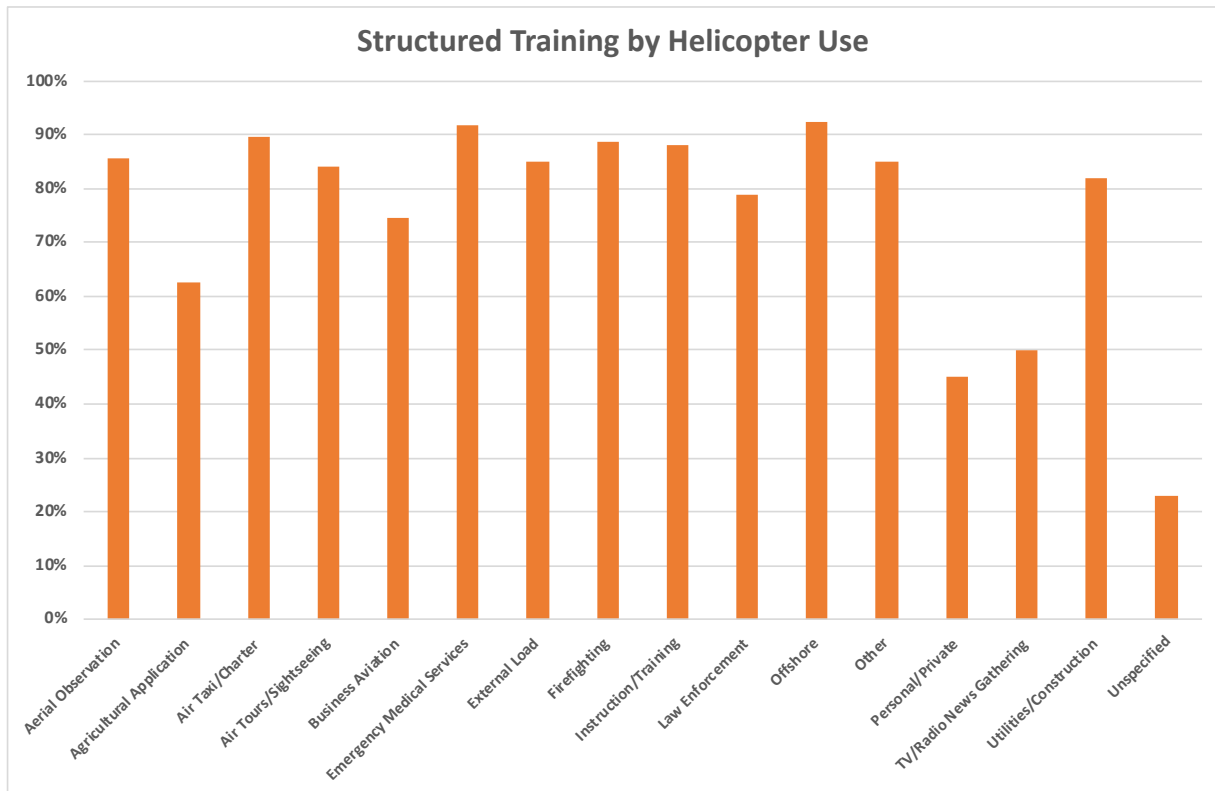
Structured training program for initial and recurrent training: Initial and recurrent training should deliver specific competencies required for the missions to be flown. Training should have specific intentions and measure desired outcomes. For example, regarding instrument flight training, the recurrent training requirement should address the ability to successfully fly the approaches required for the mission (e.g., ILS) rather than a fixed amount of flying time in actual or simulated instrument flying conditions. All pilots should get recurrent training annually, including practice of emergency procedures, preferably in fit-for-purpose flight training devices or simulators.

Here are the 2018 survey results for training.









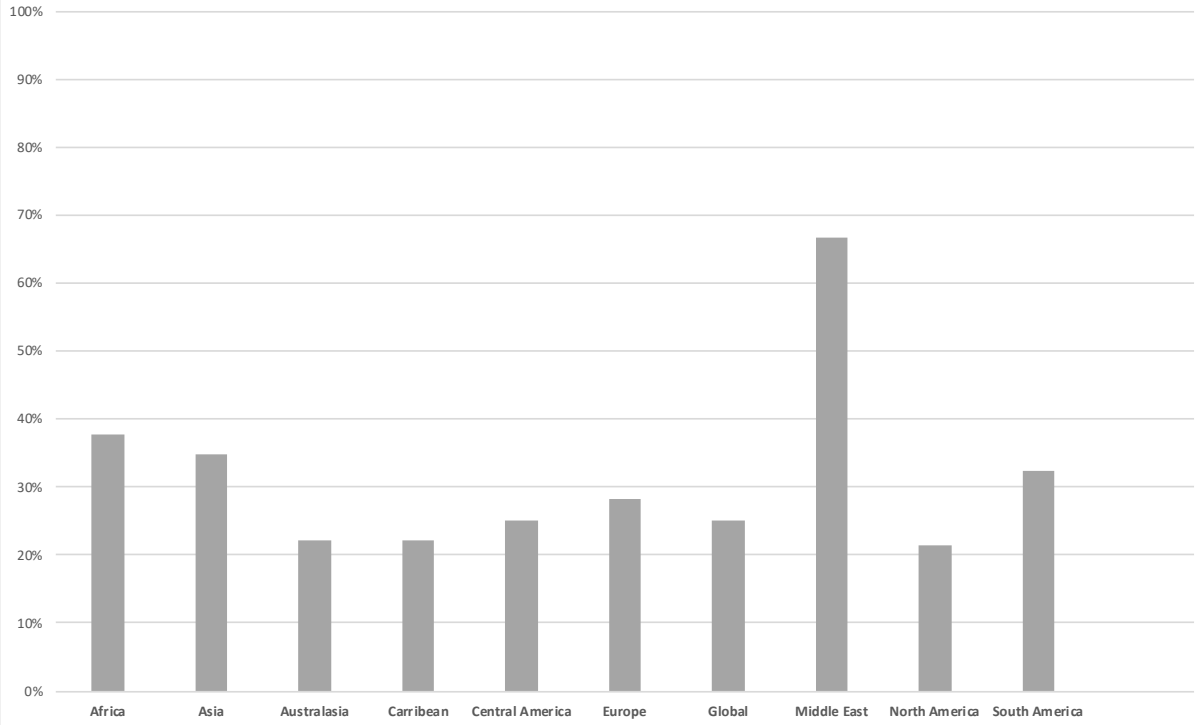
After SMS and Training, the IHSF has some key recommendations for systems and equipment, including health & usage monitoring systems (HUMS), flight data monitoring (FDM) systems, night vision goggles (NVGs) and wire strike protection. The latter two safety measures have mission-specific relevance. HUMS, in some form, and FDM are universally applicable.

With fully automated HUMS, sensors are placed at critical locations on helicopters to automatically monitor the health of mechanical components, as well as usage of the airframe and its dynamic components. HUMS record structural and transmission usage, transmission vibrations, rotor track and balance information, and engine power assurance data. HUMS monitor the health of rotating components such as gearboxes, bearings, shafts, engines, and rotors through vibration, and can also record parametric data from the aircraft's bus for usage and event analysis. HUMS can identify approaching equipment failure, enabling proactive maintenance and avoiding inflight emergencies.

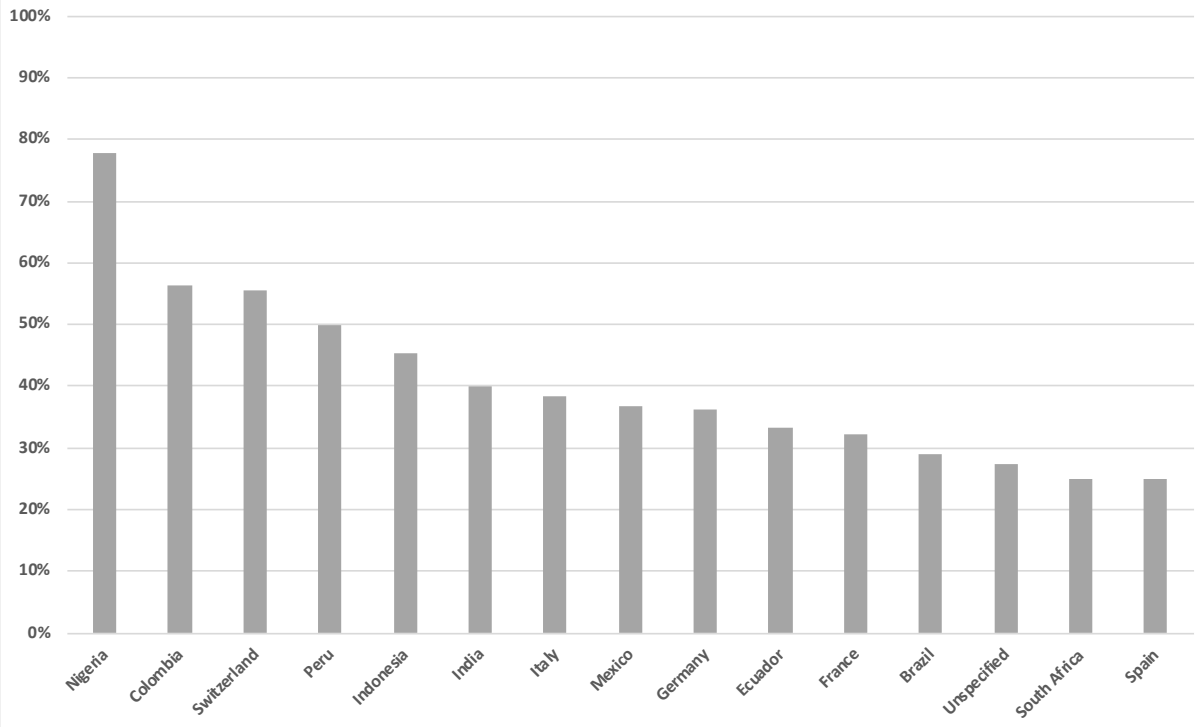
Although there are proven safety and maintenance benefits, fully automated HUMS are not available for many light helicopters. Hence, HUMS use is still relatively low, except in the offshore oil & gas industry where HUMS systems are mandated by most oil & gas companies.

To learn more about how to implement HUMS, see the IHSF maintenance toolkit and the HUMS toolkit available for free download at <http://www.ihsf.aero/Default.aspx?tabid=3050&language=en-US>.

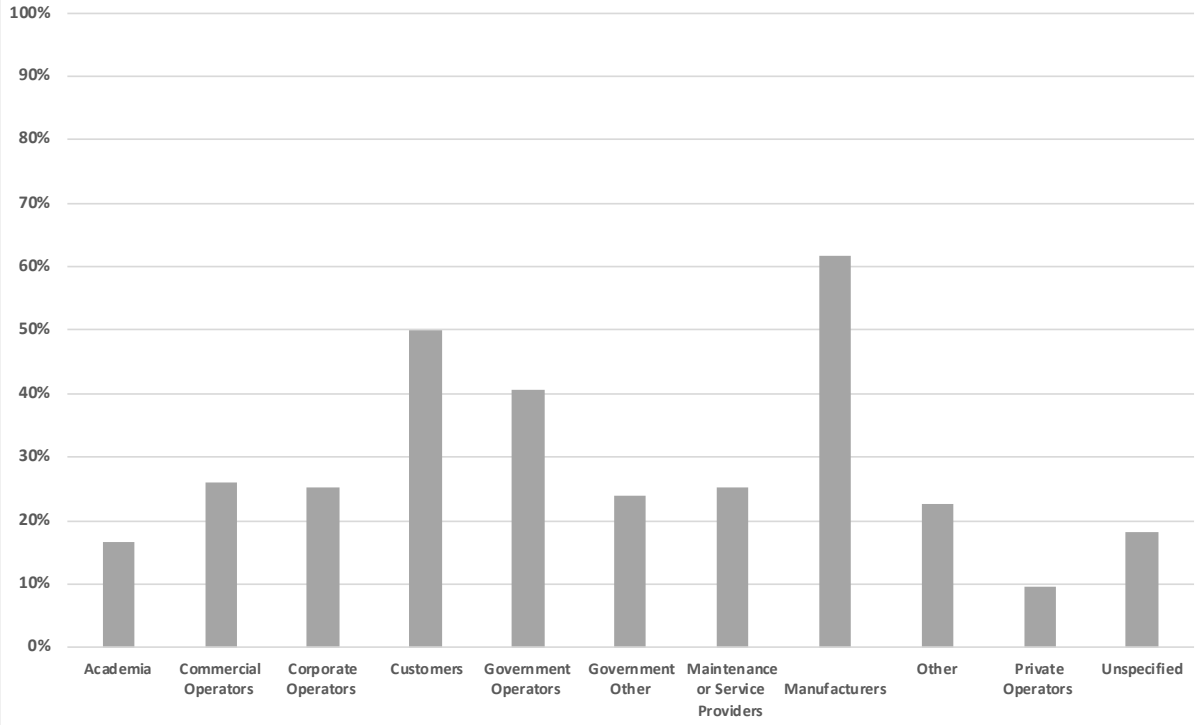
### Automated HUMS by Region



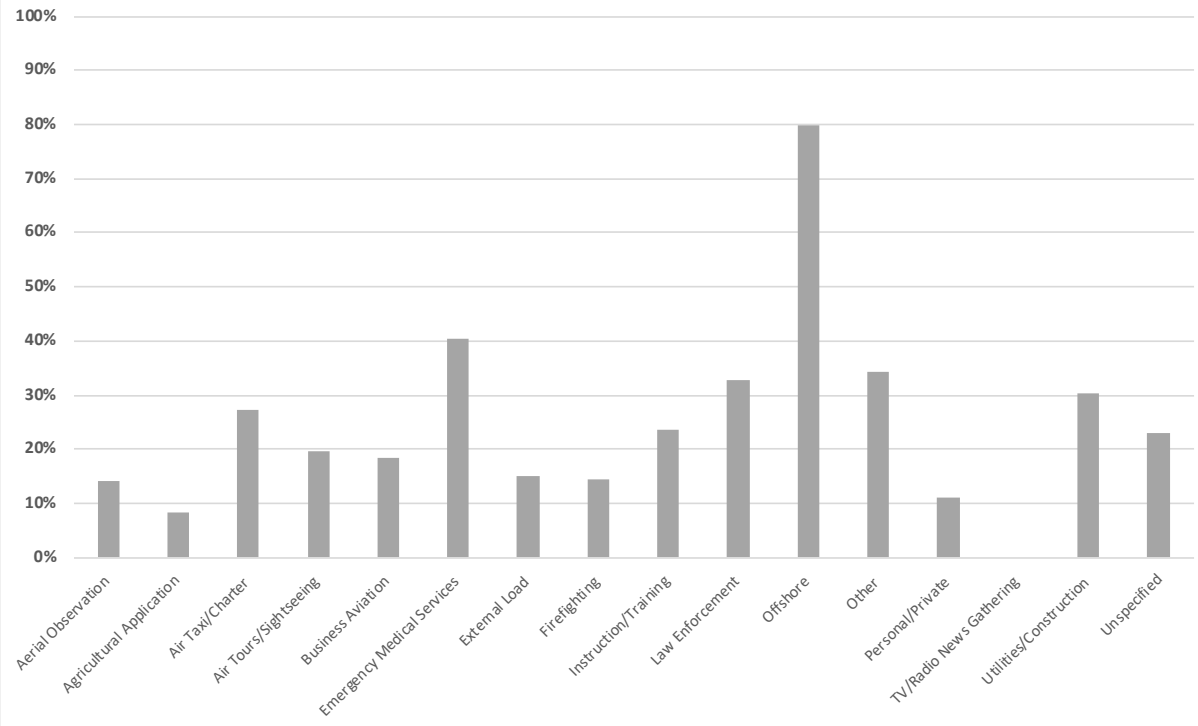
### Automated HUMS by Country



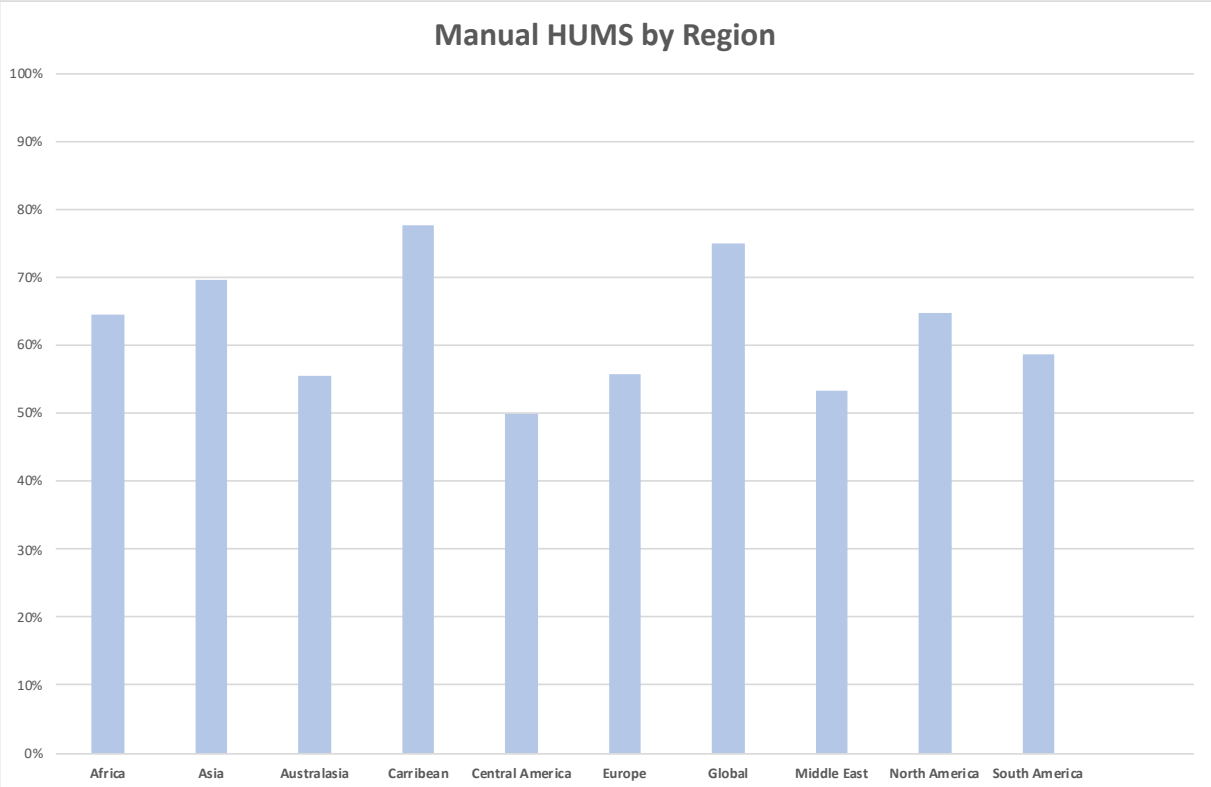
### Automated HUMS by Operator Type



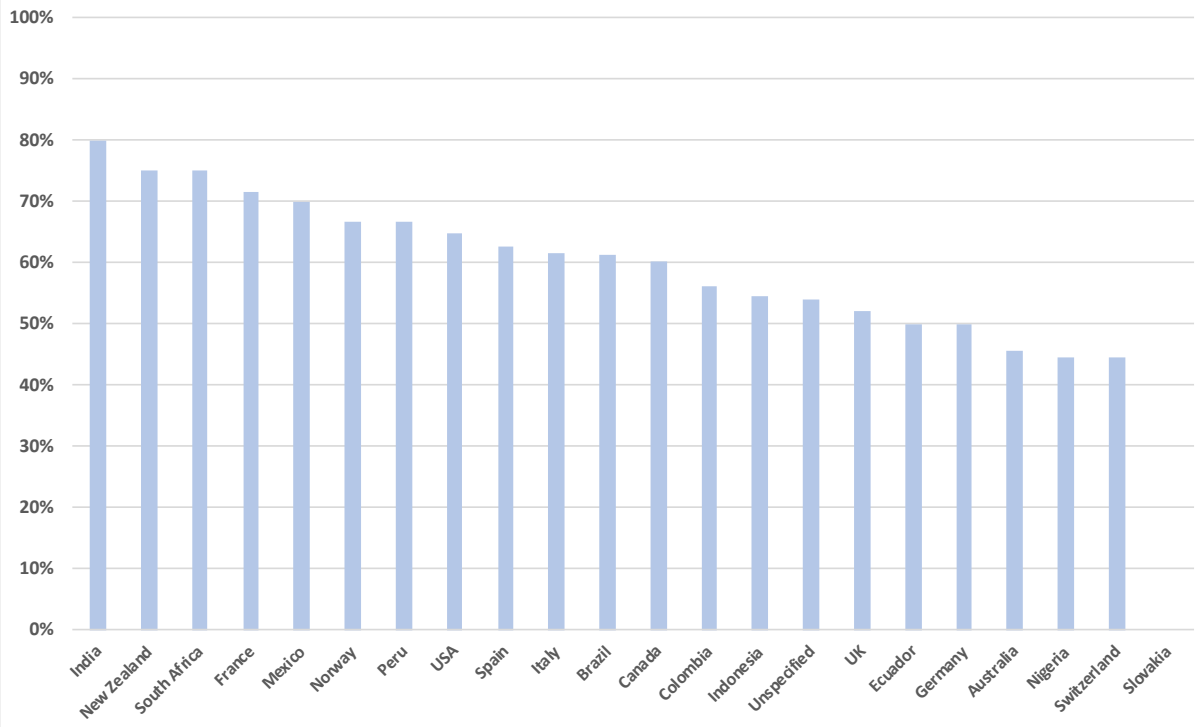
### Automated HUMS by Helicopter Use



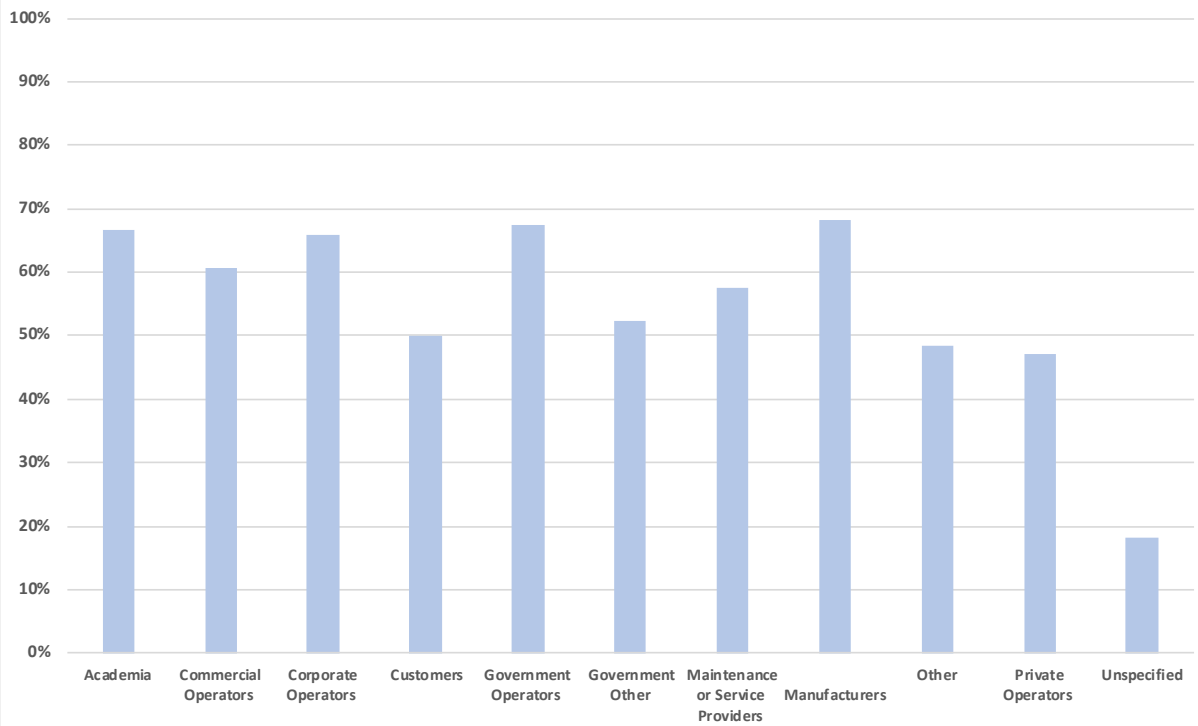
When fully automated HUMS are not available, the IHSF advocates that all operators carry out manual processes to monitor helicopters' health and usage. Operators can identify equipment problems before that equipment fails by manually monitoring certain parameters, recording data and noticing trends. Examples include engine start data, especially hot starts, power check data, and oil sampling.

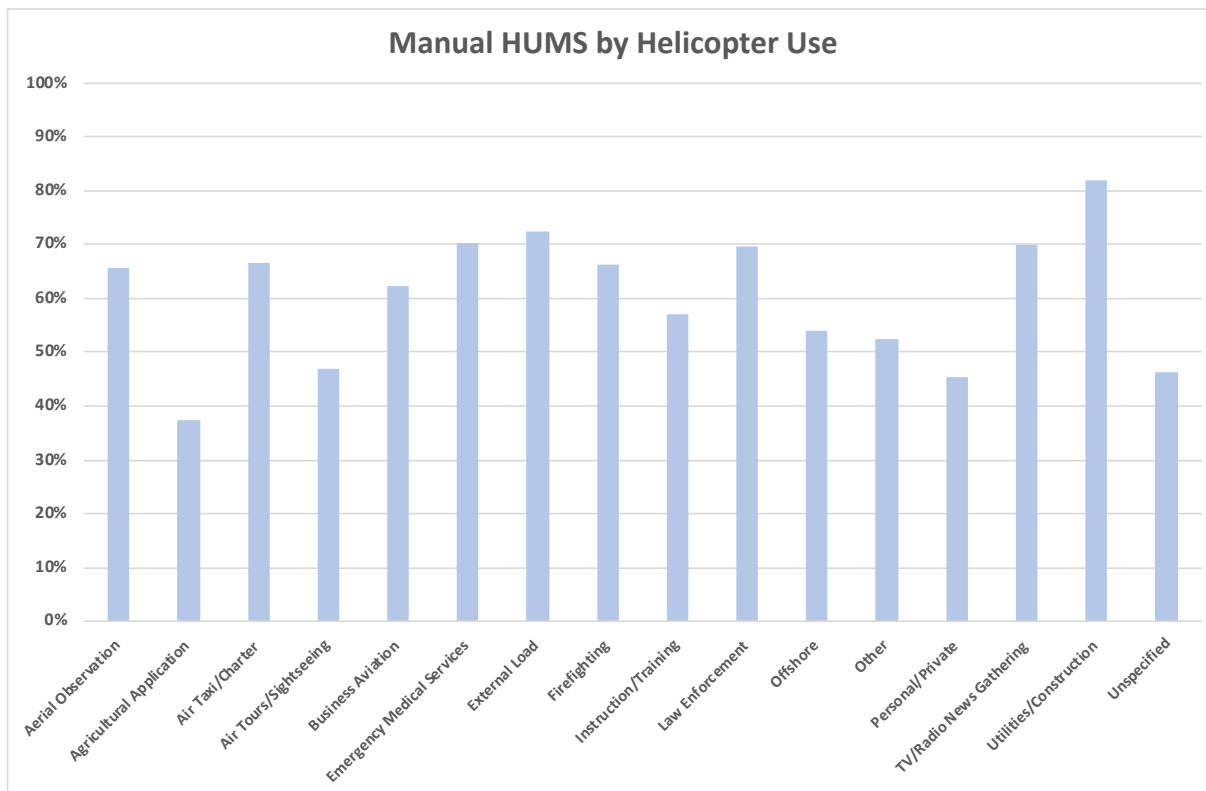


### Manual HUMS by Country



### Manual HUMS by Operator Type



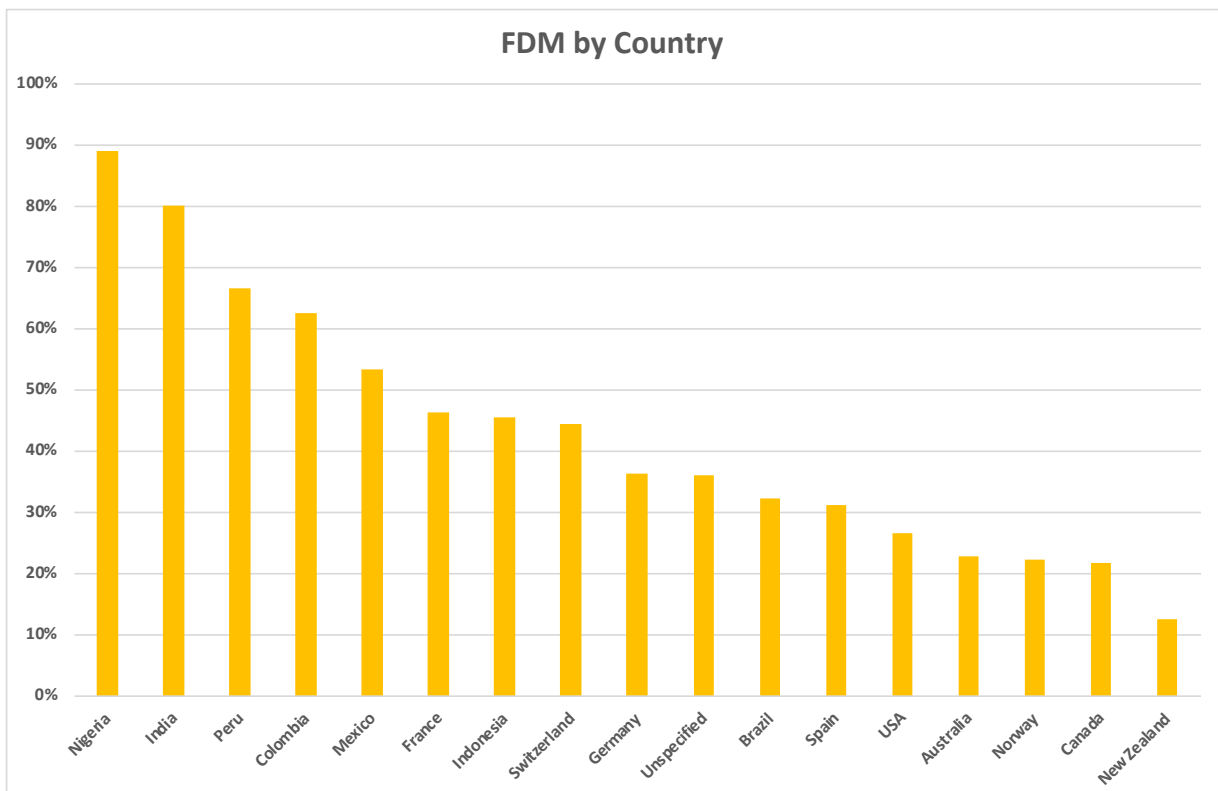
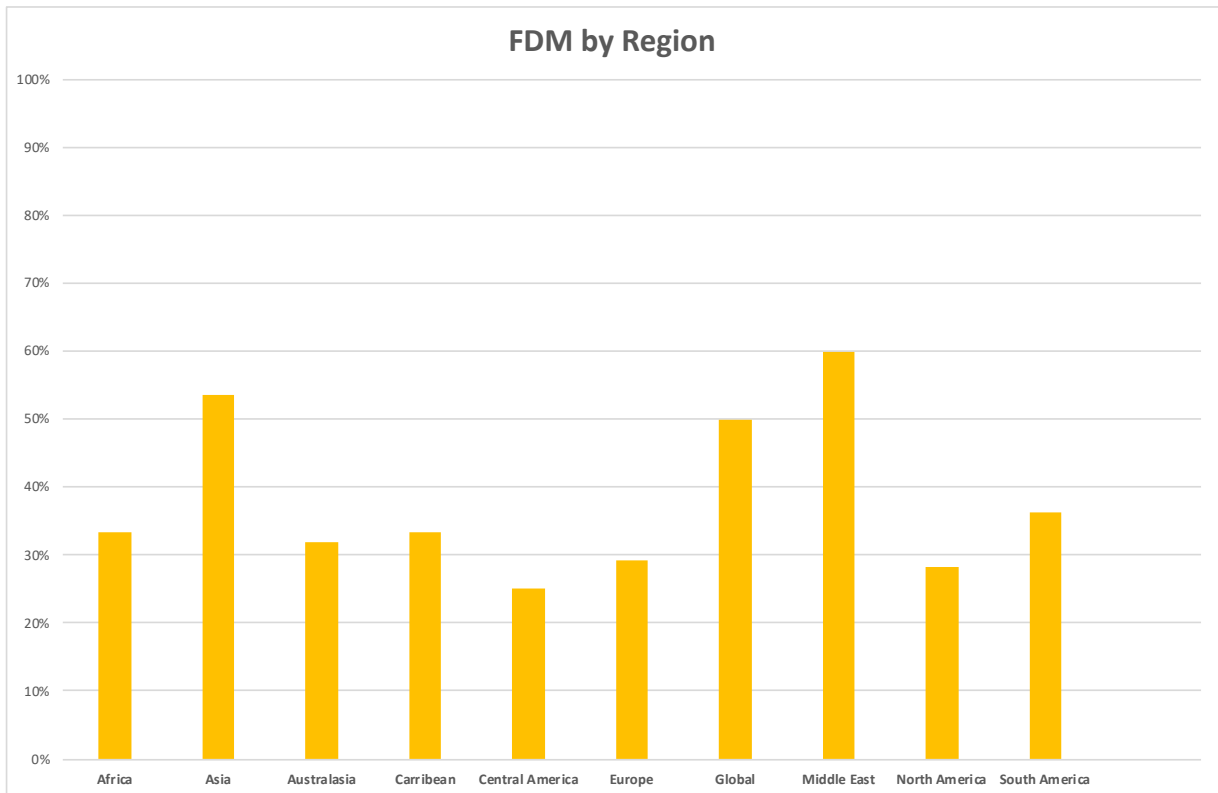


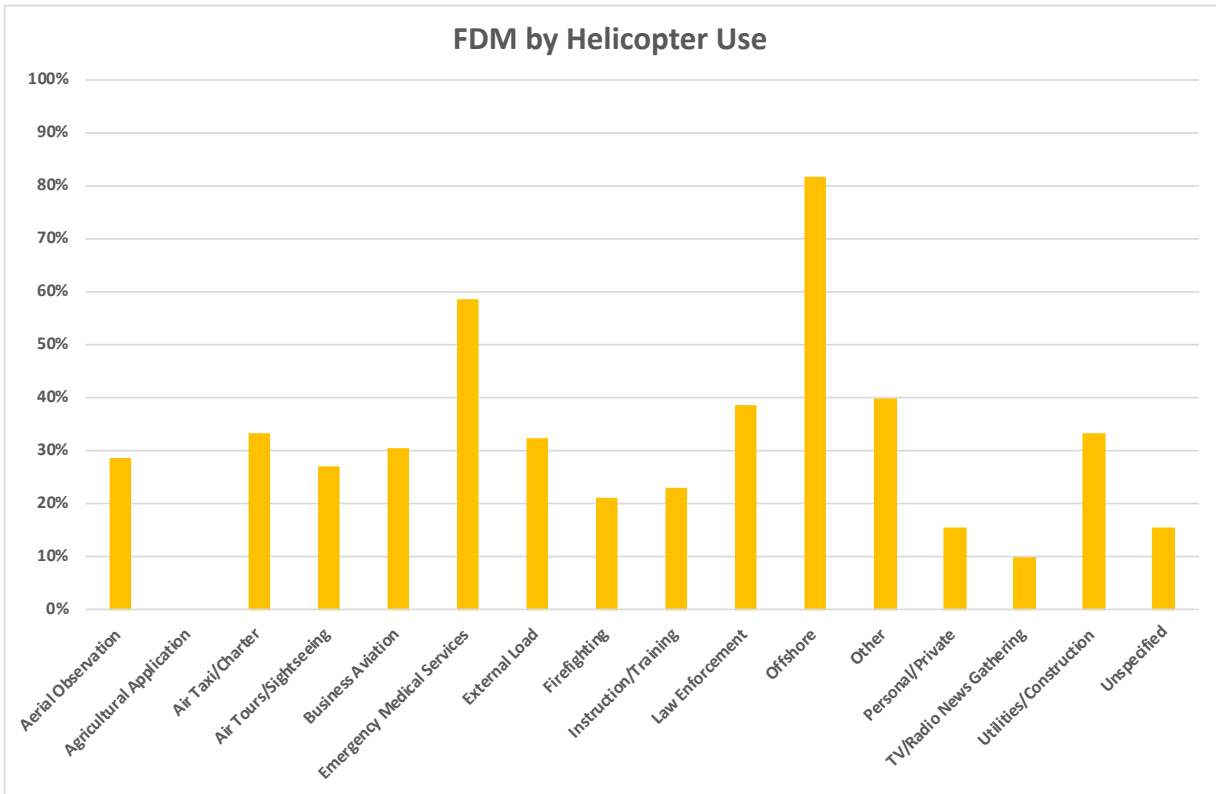
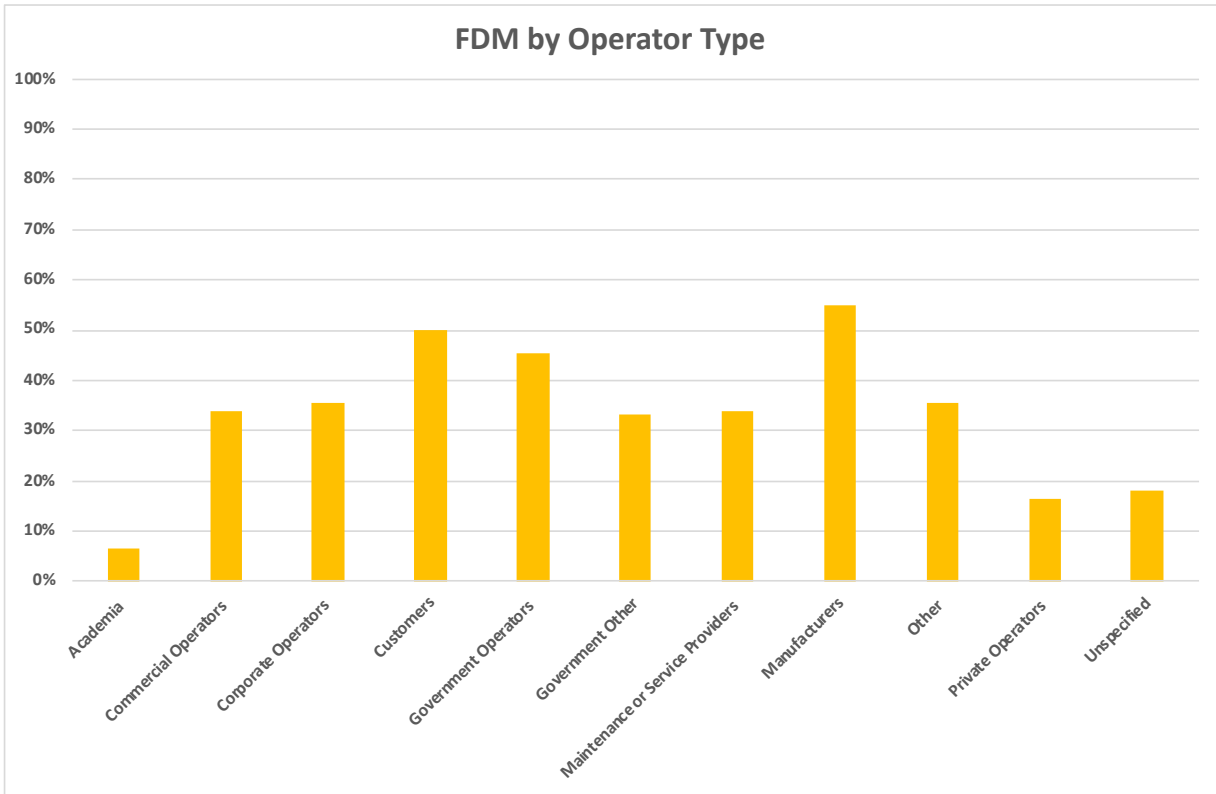
Unlike automated HUMS, which is not universally available, recording devices for flight data monitoring (FDM) are available for all helicopter types, some of which are low cost. Support groups are available to help small operators or individual pilots manage an FDM program.

Flight data monitoring (FDM) is a systematic method of accessing, analyzing, and acting upon information obtained from flight data to identify and address operational risks before they can lead to incidents and accidents. The information and insights provided by FDM can also be used to reduce operational cost and significantly enhance training effectiveness and operational, maintenance, and engineering procedures. Information from FDM programs is unique since it provides objective data that otherwise is not available.

As noted in the summary report on the 2017 survey, use of FDM is highest in the offshore oil & gas industry, where many oil & gas companies mandate its use. Second highest use of FDM is in emergency medical services (EMS), where usage increased from 56% in 2017 to 60% in 2018.

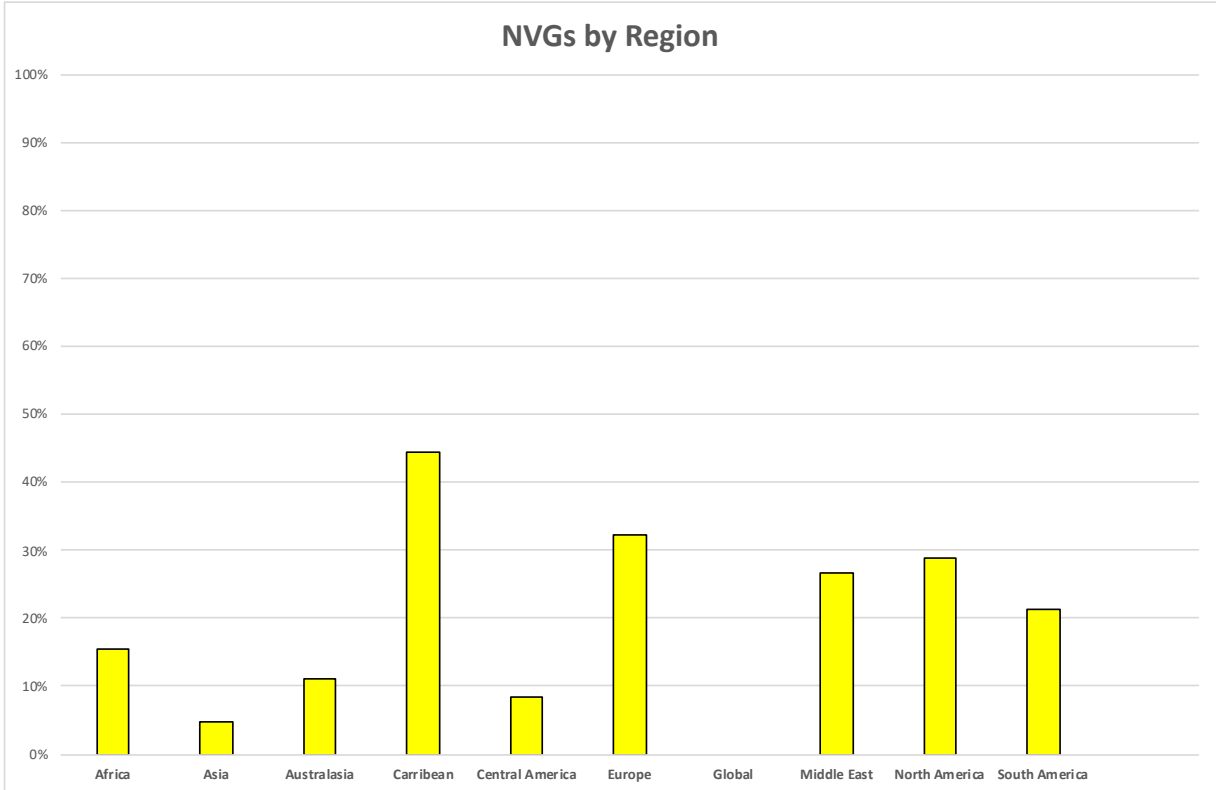
Like last year, it is disappointing to see that of the 134 operators using helicopters for instruction and training, only 23% are using FDM. FDM can be particularly valuable in the training environment by enabling students to review their flights. Perhaps many operators are unaware of the low-cost technologies available for FDM. A list of such resources is given in Appendix B of the IHSF's FDM toolkit, available for free download at <http://www.ihsf.aero/portals/54/2011HFDM.pdf>.



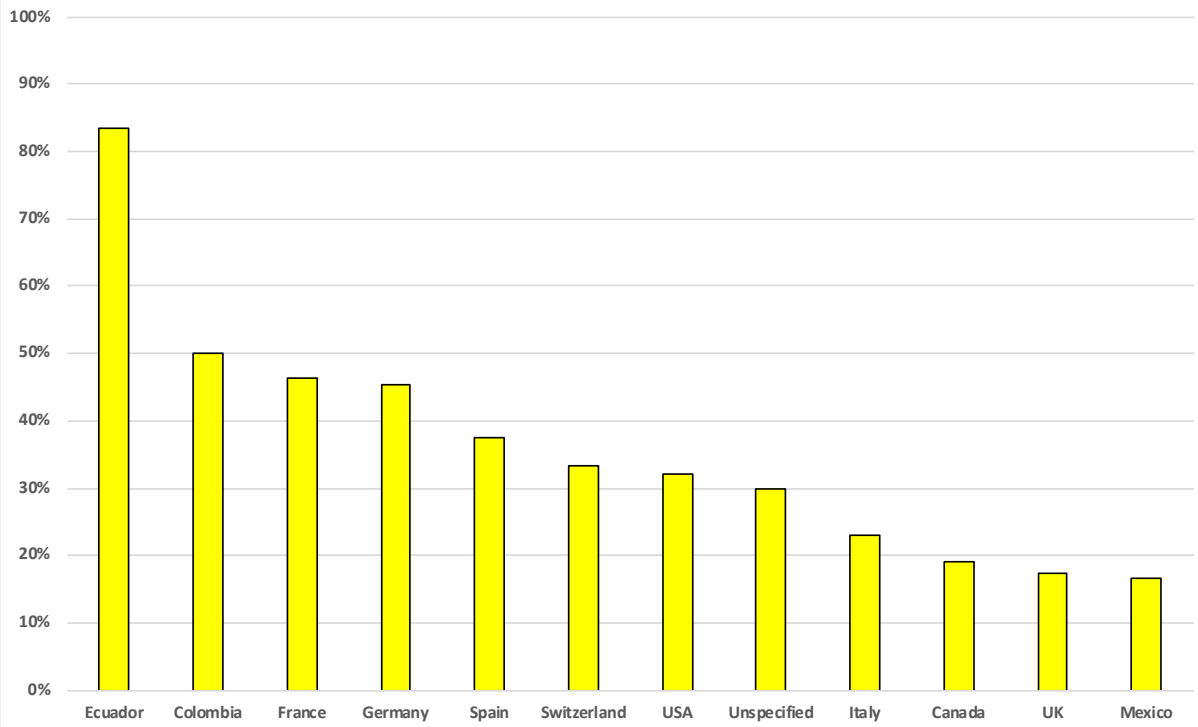




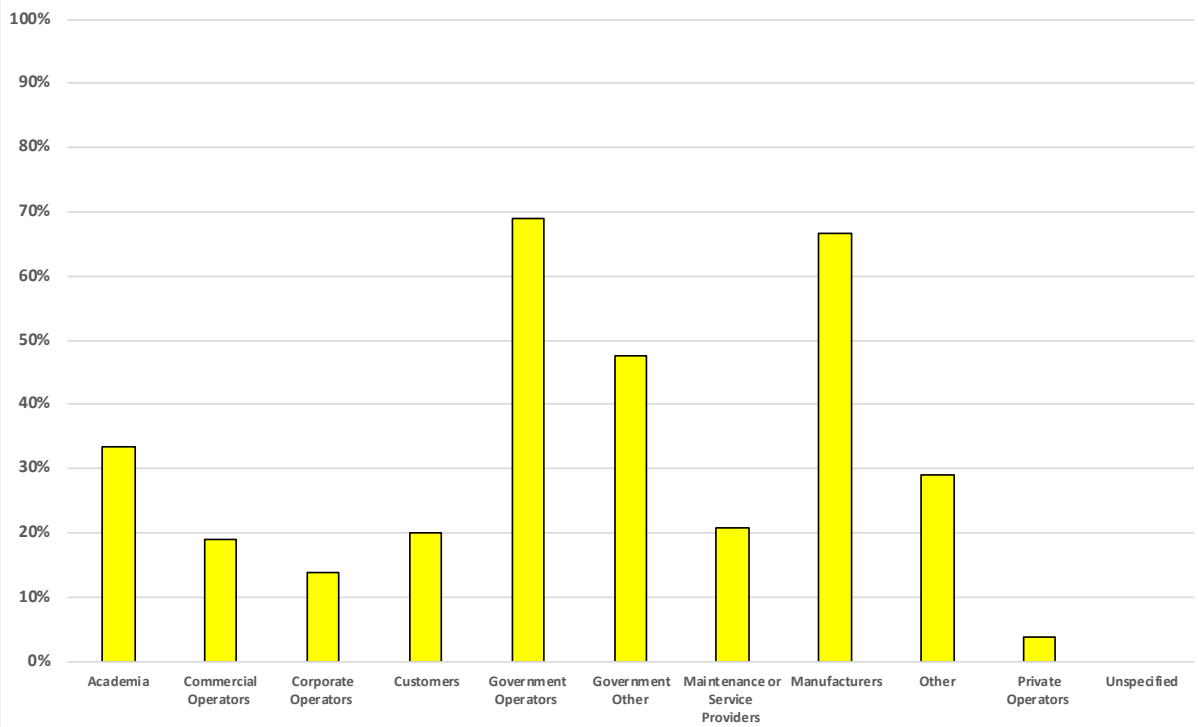
The next set of charts show the use of night vision goggles (NVGs) and wire strike protection. Given that the relevance of these safety enhancements depends on the mission, particularly NVGs, we could expect their use to be lower than most of the IHSF’s universally applicable recommendations. That expectation proved true for NVGs, but not so much for wire strike protection. As reported last year, operators using helicopters for emergency medical services (EMS) continue to lead the way in the use of NVGs. 28 of 30 US EMS operators reported using NVGs. EMS operators also lead the way in the use of wire strike protection, with 85% of all worldwide responses (93% of EMS operators in the USA) showing use of wire strike protection.

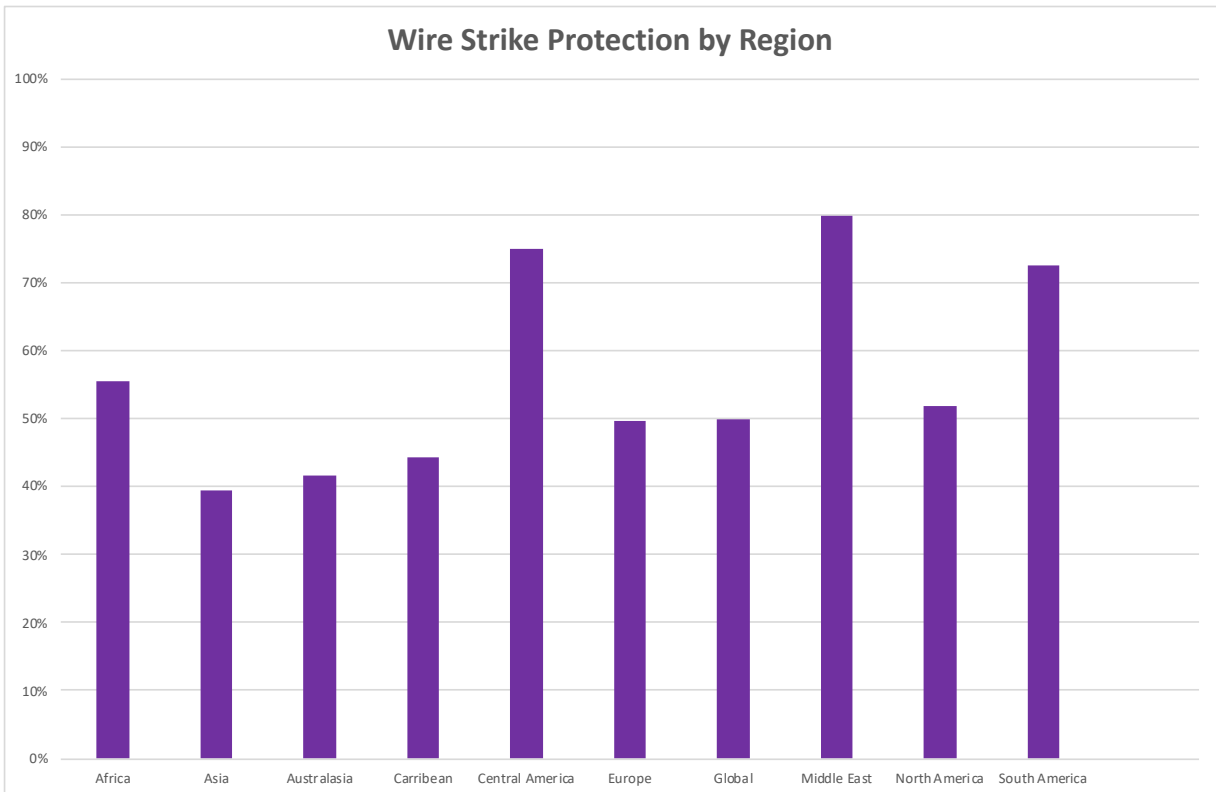
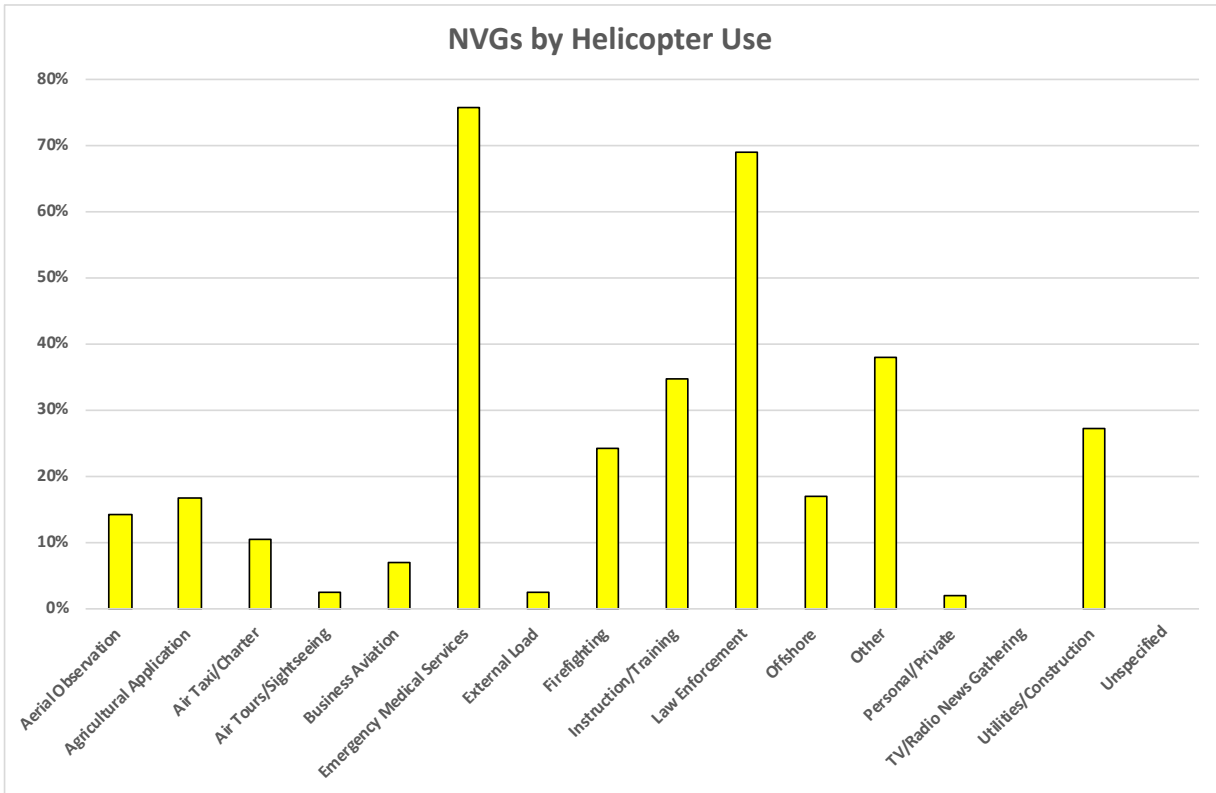


### NVGs by Country

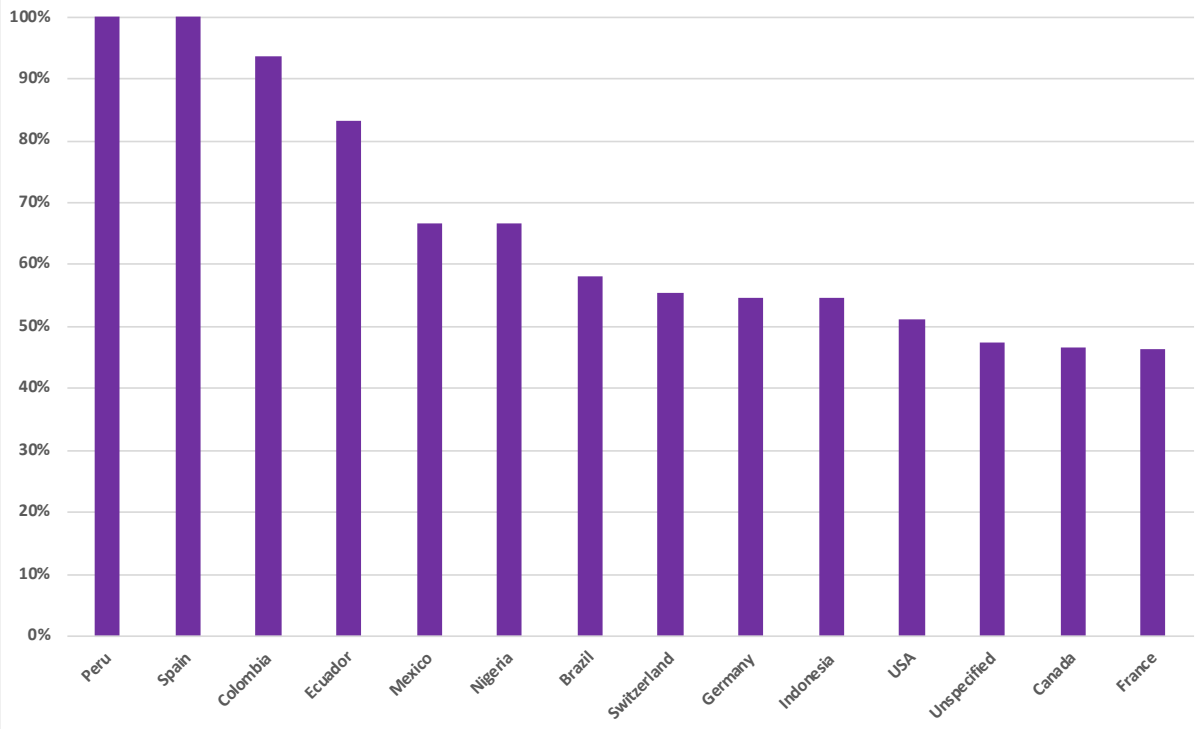


### NVGs by Operator Type

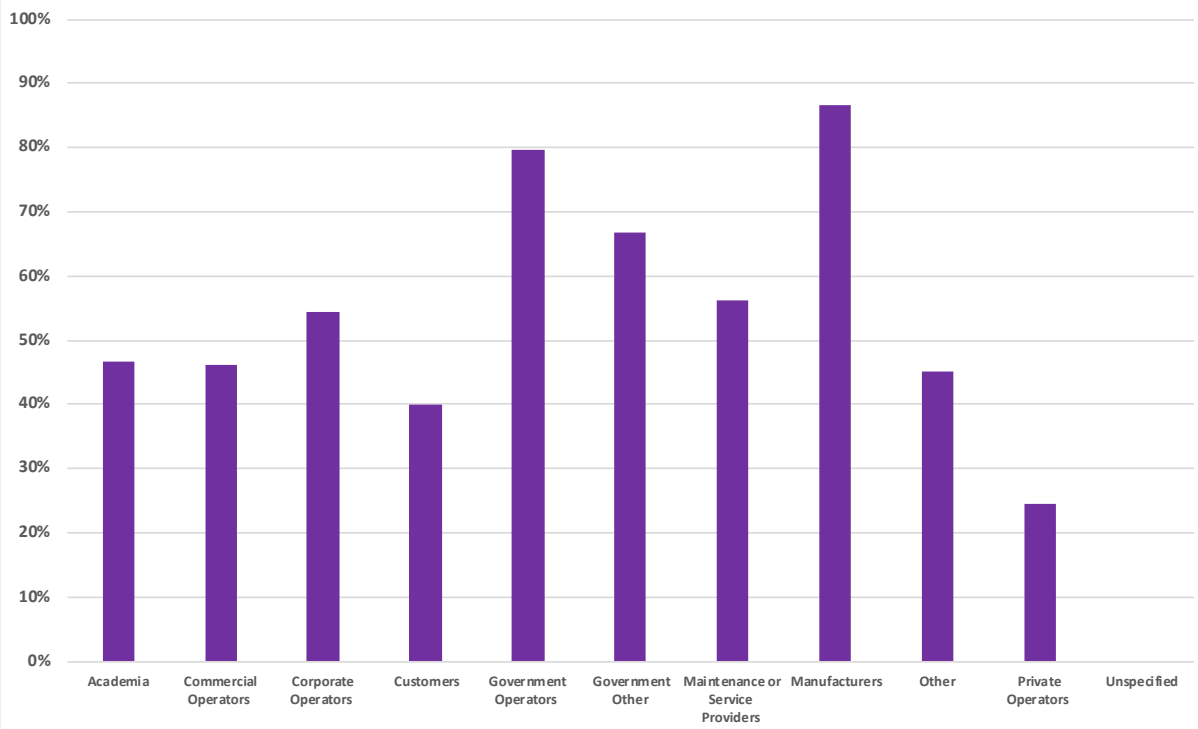


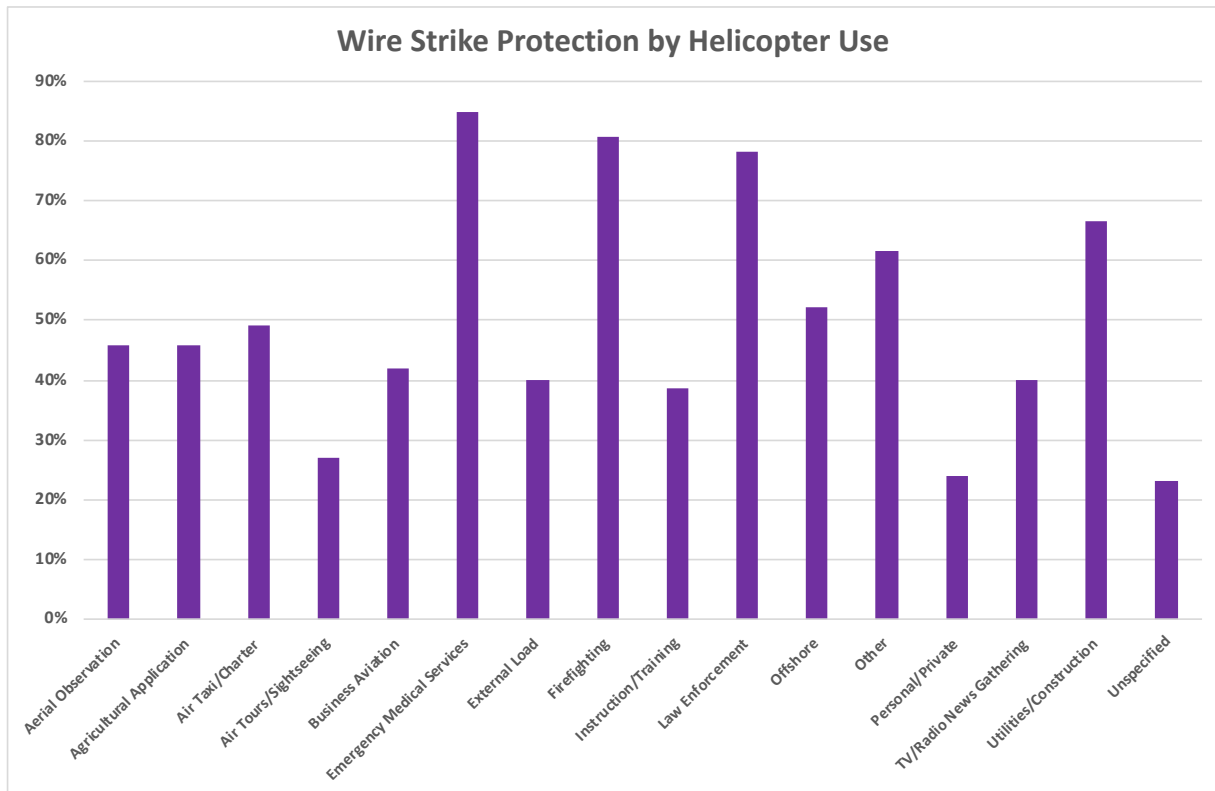


### Wire Strike Protection by Country



### Wire Strike Protection by Operator Type





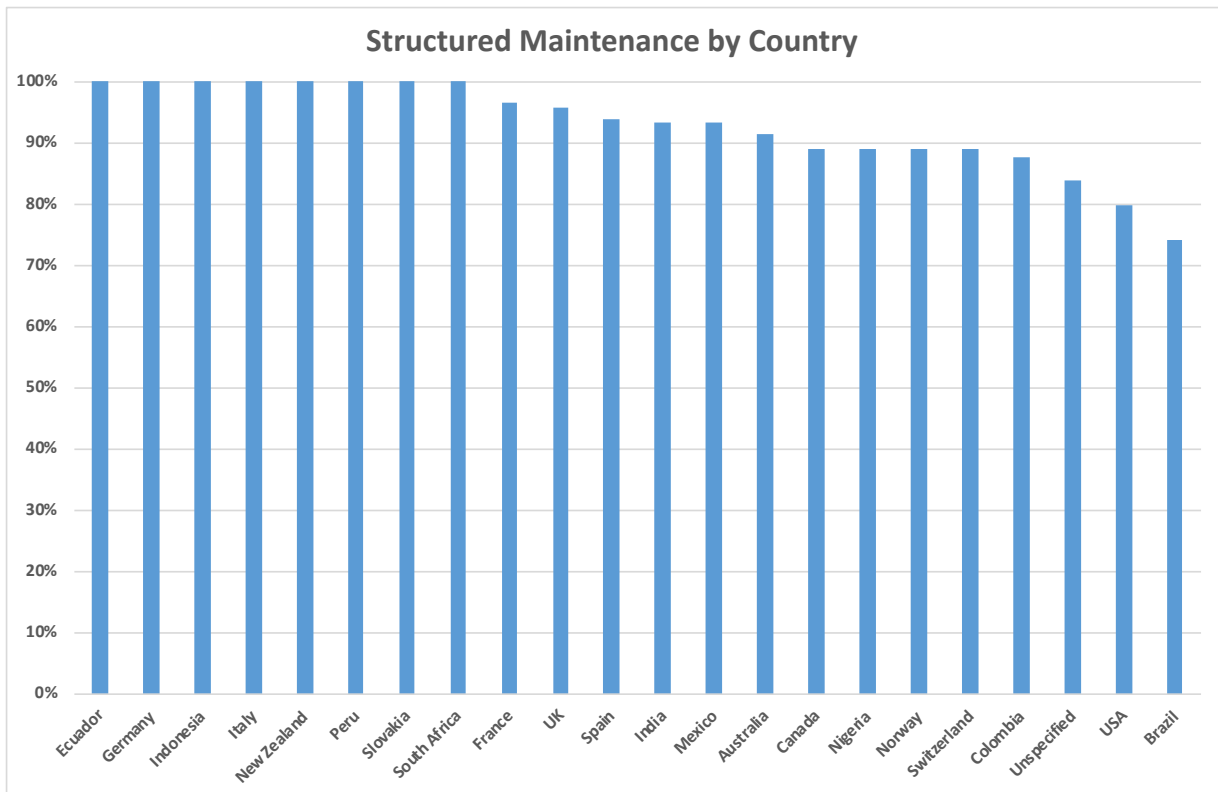
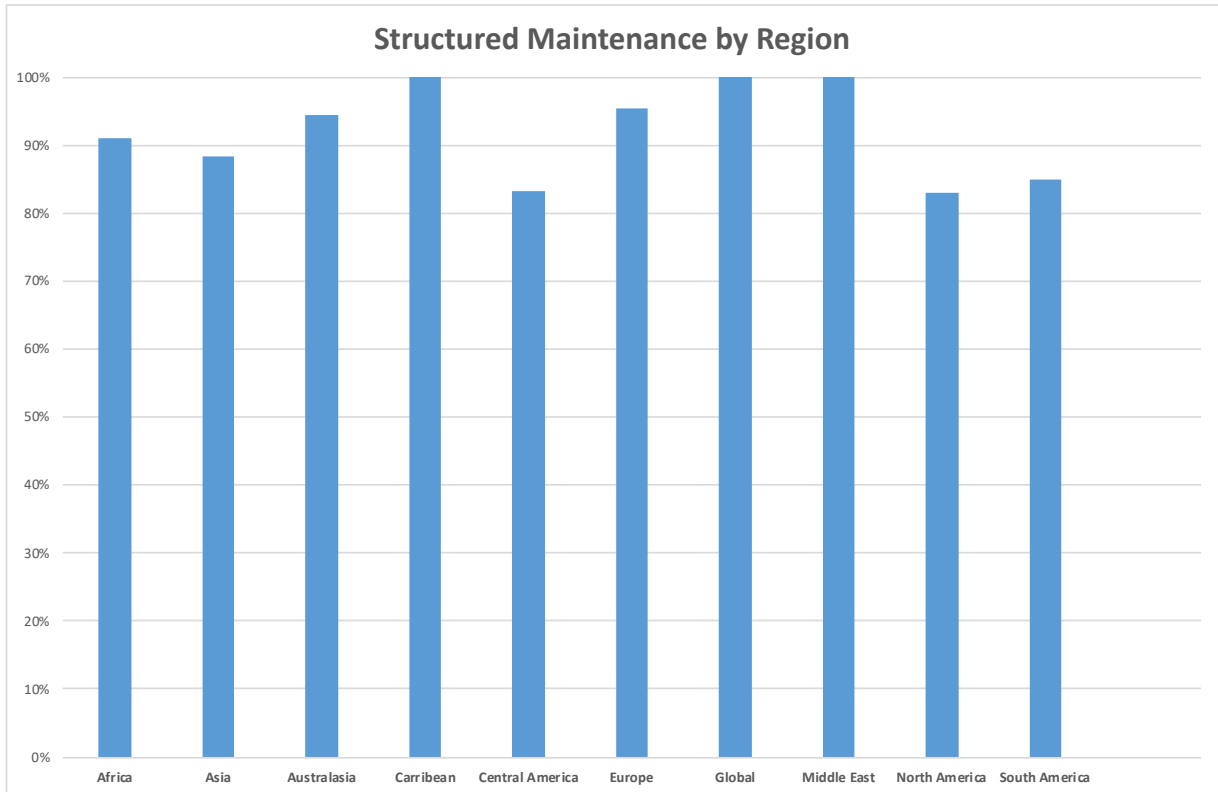
All helicopter operators, including individual owner/operators need a fit-for-purpose system or framework to ensure that they can safely maintain their aircraft in airworthy readiness for operations, in a cost-effective manner. It is essential for all the stakeholders, including the owners, operators and their customers, to agree on how maintenance is to be done and to document that agreement to assure a shared understanding and consistent execution. The structured system for helicopter maintenance management should use the manufacturer’s guidance as the baseline, assuring full compliance with the manufacturer’s recommended maintenance practices and schedule.

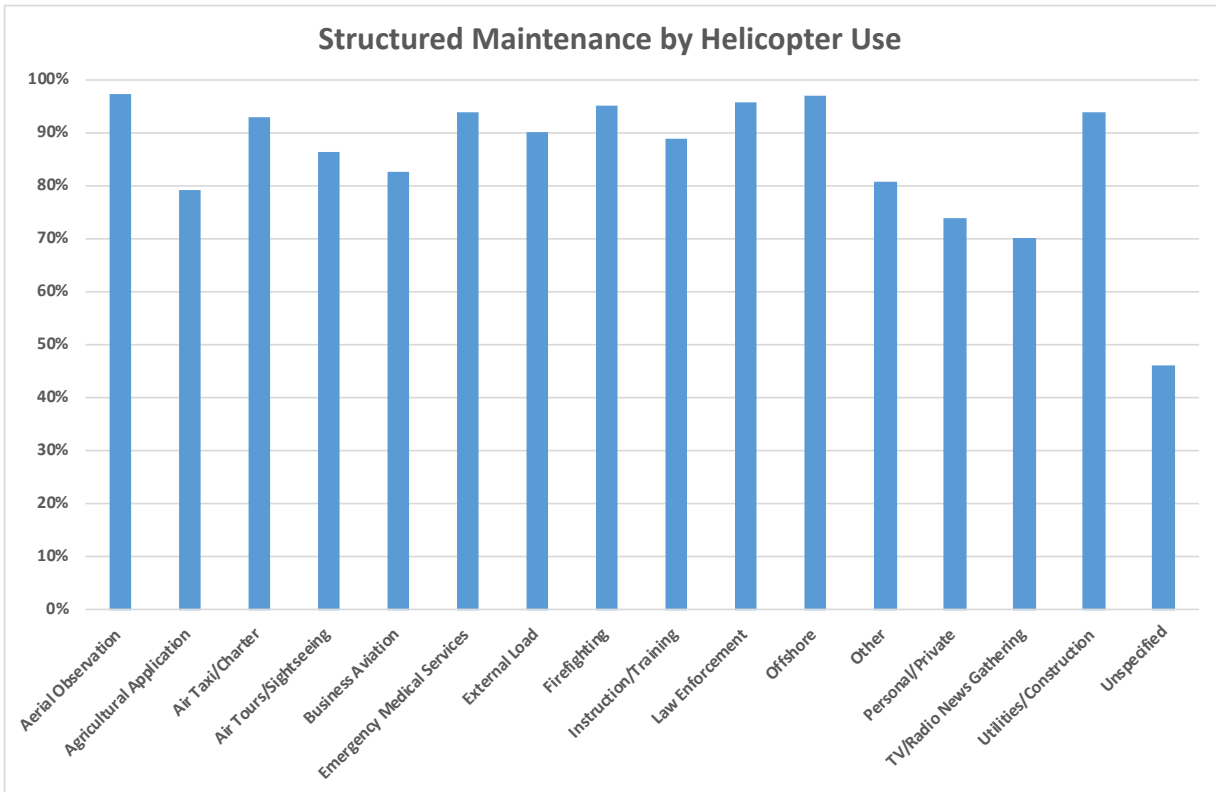
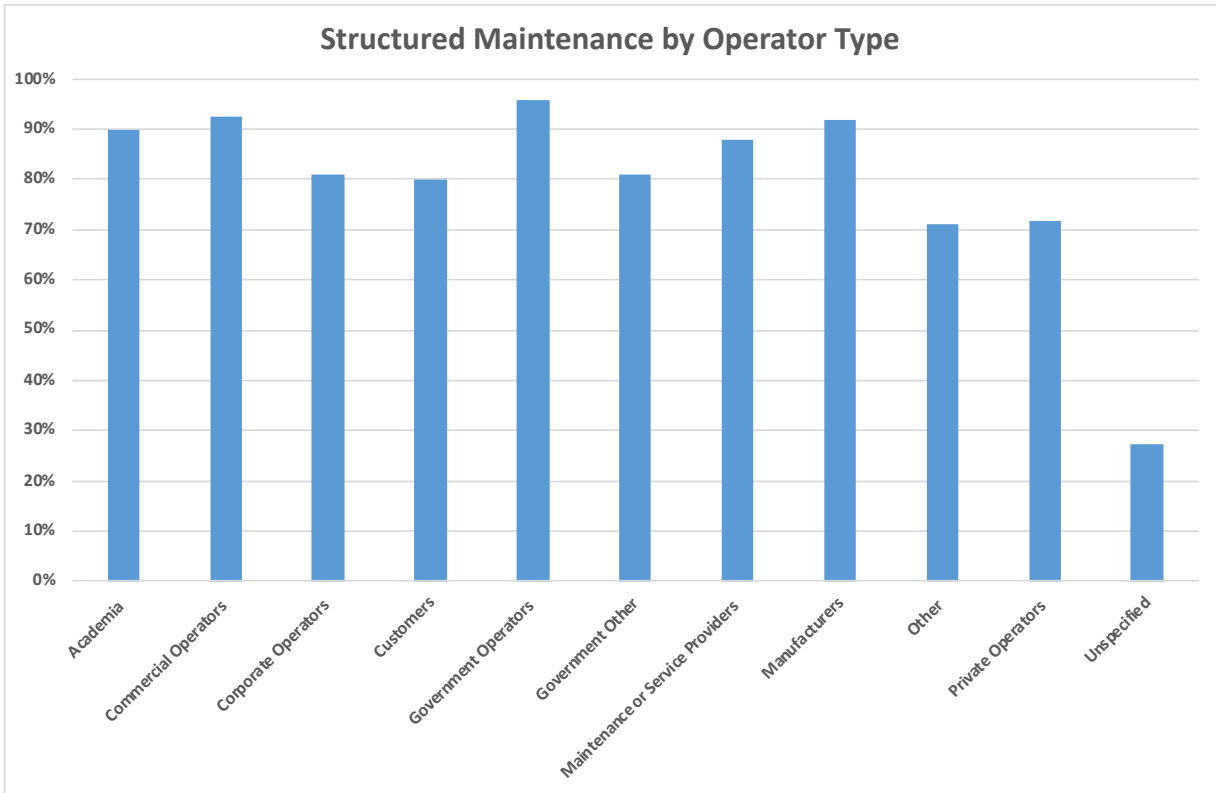
Just over 88% of all survey responses worldwide indicated the use of structured maintenance management systems, making the IHSF’s recommendations for maintenance practices the most widely adopted of the key recommendations for preventing helicopter accidents. The high use of structured maintenance management systems correlates well with the fact that far fewer helicopter accidents are caused by maintenance errors than by pilot errors. Rather than take comfort in the 88% usage result, we should all recognize that everyone should have a structured maintenance management system to ensure full compliance with manufacturer’s recommended practices. The survey result we need is 100%.

Those using helicopters for personal/private or unspecified purposes have the most to gain.

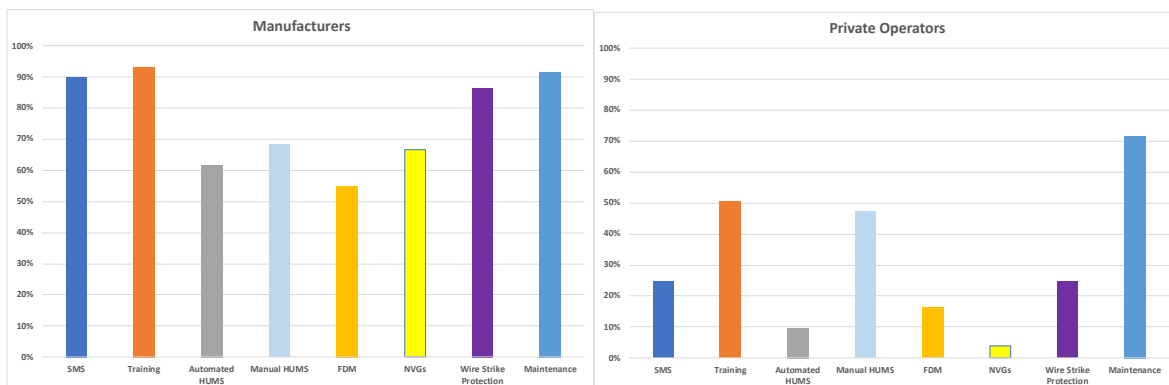
The IHSF’s free maintenance toolkit shows how

<http://www.ihsf.aero/LinkClick.aspx?fileticket=uhdMiyXCSC=&tabid=1507&language=en-US>.





Although the 2018 survey shows improvements across the board, private operators using helicopters for personal use have still adopted relatively few of the IHSF’s recommendations. This result correlates with the IHSF’s analysis showing that the personal/private operators have high accident counts. Hence, these operators have the most to gain from adopting the IHSF’s key recommendations. The following charts show the gap between private operators’ use of the IHSF’s key recommendations and that by operators who reported their type of operation as “Manufacturer.” Those operators identifying their type of operation as “Manufacturer” reported overall adoption of 83% of the IHSF’s key recommendations – the highest overall use of the IHSF’s key recommendations by any type of operation.



**Conclusions:** Again in 2018, the IHSF’s global safety survey results show that adoption of the IHSF’s key recommendations is highest in the groups with the lowest accident rates, particularly the offshore helicopter operators. So, although correlation does not necessarily mean causation, the data supports the conclusion that the IHSF’s key recommendations are very effective in preventing helicopter accidents.

Another conclusion that may be drawn from this correlation is that customer awareness of and insistence on the use of best practices for safety can be as important as regulatory support. The challenge for those who share the IHSF vision of zero accidents is to engage all those who use helicopters in reviewing the overwhelming evidence for these best practices:

1. Safety Management Systems (SMS)
2. Structured programs for initial and recurrent training
3. Mission-specific systems and equipment, including:
  - a. Health & usage monitoring systems (HUMS)
  - b. Flight data monitoring (FDM) programs
  - c. Night vision goggles
  - d. Wire strike protection
4. Structured programs to fully comply with manufacturers’ recommended maintenance practices



The IHSF Executive Committee has committed to repeat this survey every year. If you completed the survey in 2015, 2016, 2017 or 2018 please do so again in 2019 so that we can build a growing base of annual status reports from helicopter industry stakeholders on their use of the key best practices recommended by the IHSF.

Look for a relaunch of the IHSF global safety survey on [www.ihsf.aero](http://www.ihsf.aero). Spread the word!



## Appendix 1

### IHSF Global Helicopter Safety Survey

The IHSF's regional teams have analyzed over 1,000 helicopter accidents and determined that the following four areas offer the best opportunities to prevent helicopter accidents:

1. Safety Management Systems (SMS)
2. Structured programs for initial and recurrent training
3. Mission-specific systems and equipment, including:
  - a. Health & usage monitoring systems (HUMS)
  - b. Flight data monitoring (FDM) programs
  - c. Night vision goggles
  - d. Wire strike protection
4. Structured programs to fully comply with manufacturers' recommended maintenance practices

This IHSF global safety survey is intended to assess the progress toward full implementation of these practices within each industry sector in every region. While some of the recommended systems and equipment have mission specific application, the other recommendations for SMS, training and maintenance practices are universally applicable.

**CONFIDENTIALITY:** Your inputs will be kept confidential and will not be shared for advertising or marketing. The survey summary report will aggregate inputs by type of operation and use. Individual inputs will not be attributed to you or your company.

1. Email address:

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2. Your type of organization related to helicopters (**Check only one.**)

Commercial operator	Private Operator	Manufacturer	Government regulator or safety organization
Corporate operator	Academia	Maintenance or service provider	Other
Government operator	Customer		

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3. How does your company use or support helicopters (**Check only one** representing your main activity.)

Aerial observation	Emergency medical services	Logging
Agricultural application	External load	Offshore
Air taxi/charter	Firefighting	Personal/Private
Air Tours/Sightseeing	Instruction/Training	TV/Radio news gathering
Business aviation	Law enforcement	Utilities/Construction
Other		

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4. Do you or your organization have a Safety Management System (SMS)?

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5. Do you or your organization have a structured program for initial and recurrent training?

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6. Do you or your organization use fully automated health & usage monitoring systems (HUMS)?

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7. If you or your organization do **not** use fully automated systems for HUMS, do you have other systems for identifying exceedances (e.g., hot start, over-torque), monitoring engine power trends, checking oil samples, and other such means of monitoring helicopter health and usage?

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8. Do you or your organization have a flight data monitoring (FDM) program?

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9. Do you or your organization use night vision goggles?

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10. Do you or your organization use wire strike protection on your helicopter(s)?

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11. Do you or your organization have a structured maintenance management system to fully comply with manufacturers' recommended practices?

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12. Do you have any suggestions for getting more operators to adopt the IHSF's key recommended practices?

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Country of Operation (optional):

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Your contact information (optional):

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Explanatory Pop-Ups (these explanations appear after clicking hypertext linked words (e.g., SMS) on the survey form on [www.ihsf.aero](http://www.ihsf.aero)).

SMS: A safety management system (SMS) is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. The key elements of an SMS are (1) Policy and Objectives, (2) Risk Management, (3) Assurance, and (4) Promotion. An SMS should be structured, documented and carried out in a fit-for-purpose way to assure that all risks are assessed and then continuously managed to a level as low as reasonably practicable.

Structured training program for initial and recurrent training: Initial and recurrent training should deliver specific competencies required for the missions to be flown. Training should have specific intentions and measure desired outcomes. For example, regarding instrument flight training, the recurrent training requirement should address the ability to successfully fly the approaches required for the mission (e.g., ILS) rather than a fixed amount of flying time in actual or simulated instrument flying conditions. All pilots should get recurrent training annually, including practice of emergency procedures, preferably in fit-for-purpose flight training devices or simulators.

Fully automated HUMS: With fully automated HUMS, sensors are placed at critical locations on helicopters to automatically monitor the health of mechanical components, as well as usage of the airframe and its dynamic components. HUMS record structural and transmission usage, transmission vibrations, rotor track and balance information, and engine power assurance data. HUMS monitor the health of rotating components such as gearboxes, bearings, shafts, engines, and rotors through vibration, and can also record parametric data from the aircraft's bus for usage and event analysis. HUMS can identify approaching equipment failure, enabling proactive maintenance and avoiding inflight emergencies.

"Manual HUMS": Even when helicopters are not equipped with automated systems for monitoring health & usage, operators can identify equipment problems before that equipment fails by manually monitoring certain parameters, recording data and noticing trends. Examples include engine start data, especially hot starts, power check data, and oil sampling.

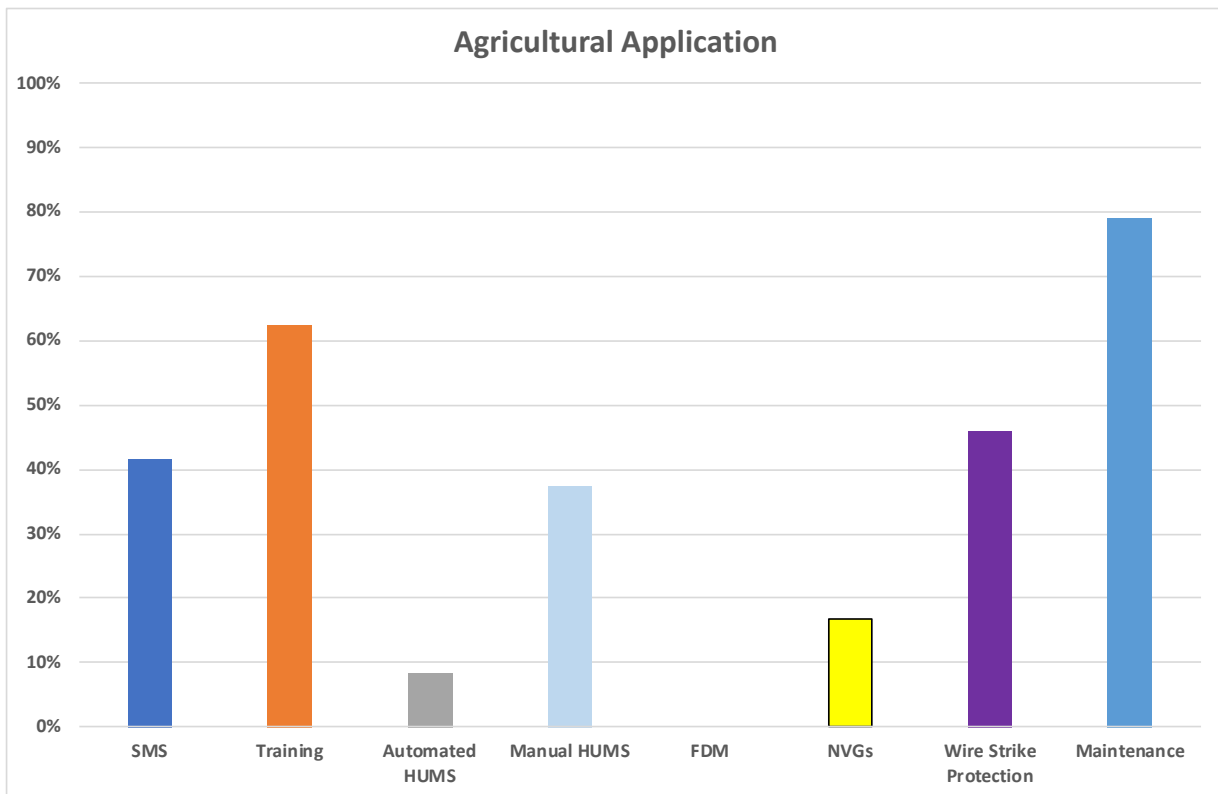
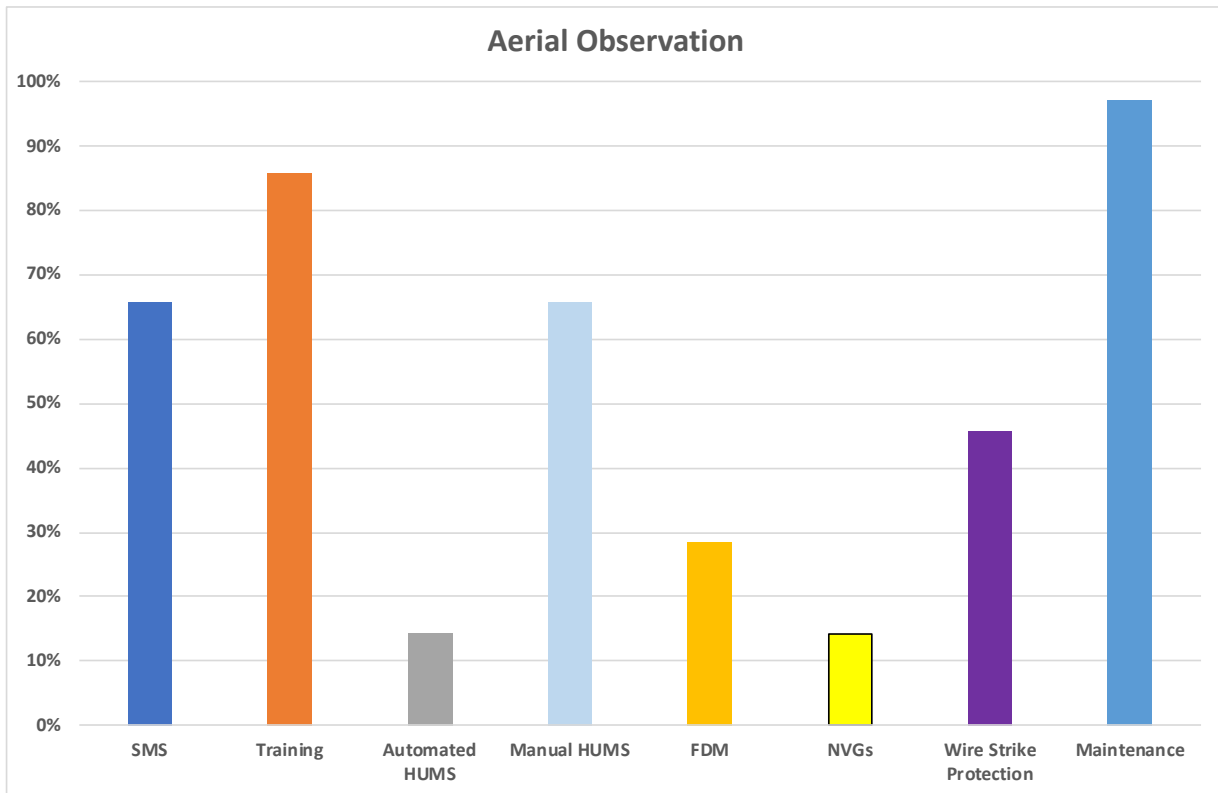
FDM: Flight data monitoring (FDM) is a systematic method of accessing, analyzing, and acting upon information obtained from flight data to identify and address operational risks before they can lead to incidents and accidents. The information and insights provided by FDM can also be used to reduce operational cost and significantly enhance training effectiveness and operational, maintenance, and engineering procedures. Information from FDM programs is unique since it provides objective data that otherwise is not available. Low cost devices are available for all helicopter types. Support groups are available to help small operators or individual pilots manage an FDM program.

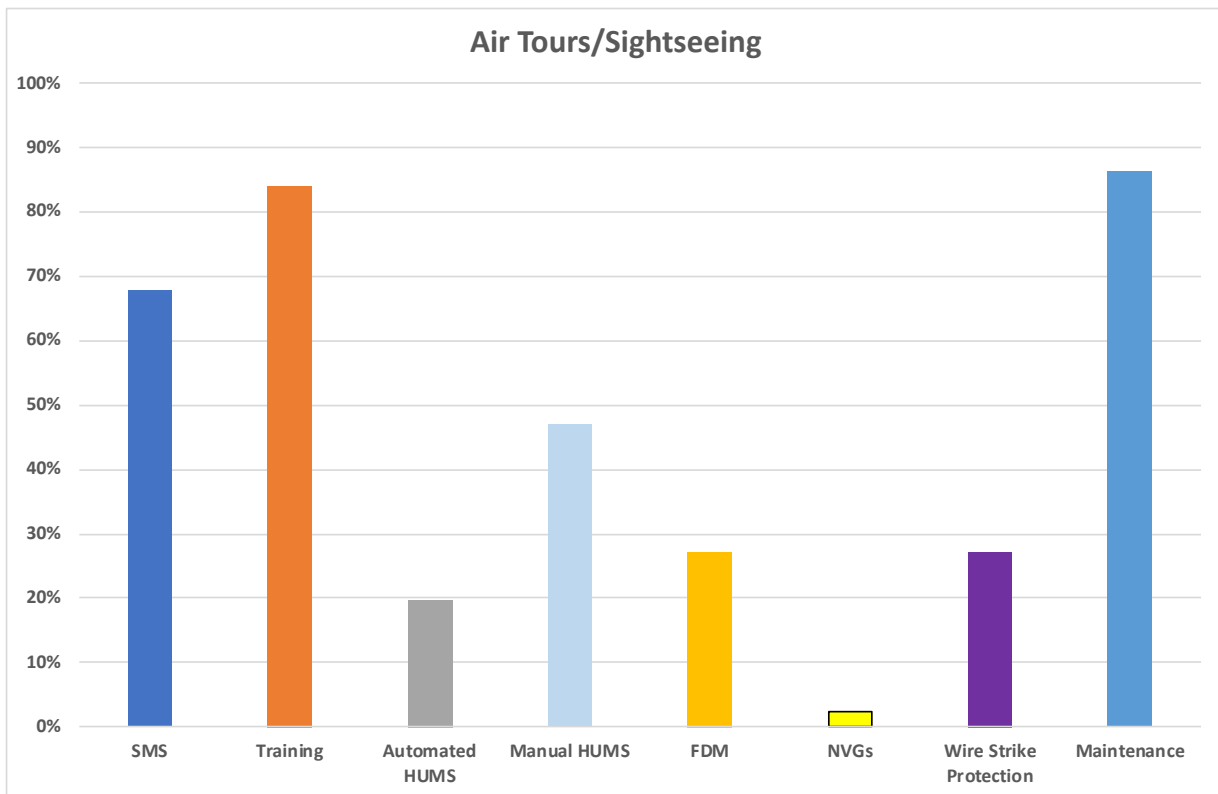
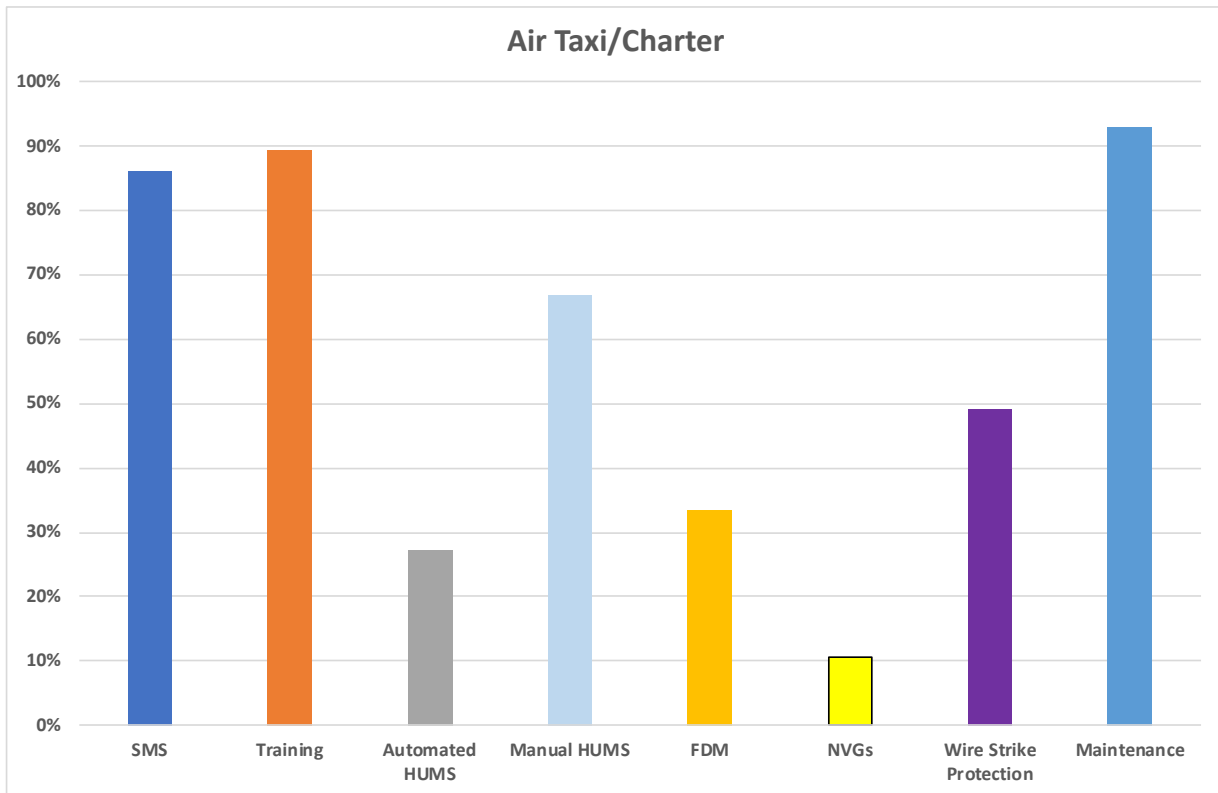
Structured maintenance management systems: All helicopter operators, including individual owner/operators need a fit-for-purpose system or framework to ensure that they can safely maintain their aircraft in airworthy readiness for operations, in a cost-effective manner. It is essential for all the stakeholders, including the owners, operators and their customers, to agree on how maintenance is to be done and to document that agreement to assure a shared understanding and consistent execution. The structured system for helicopter maintenance management should use the manufacturer's guidance as the baseline, assuring full compliance with the manufacturer's recommended maintenance practices and schedule.

## **Appendix 2**

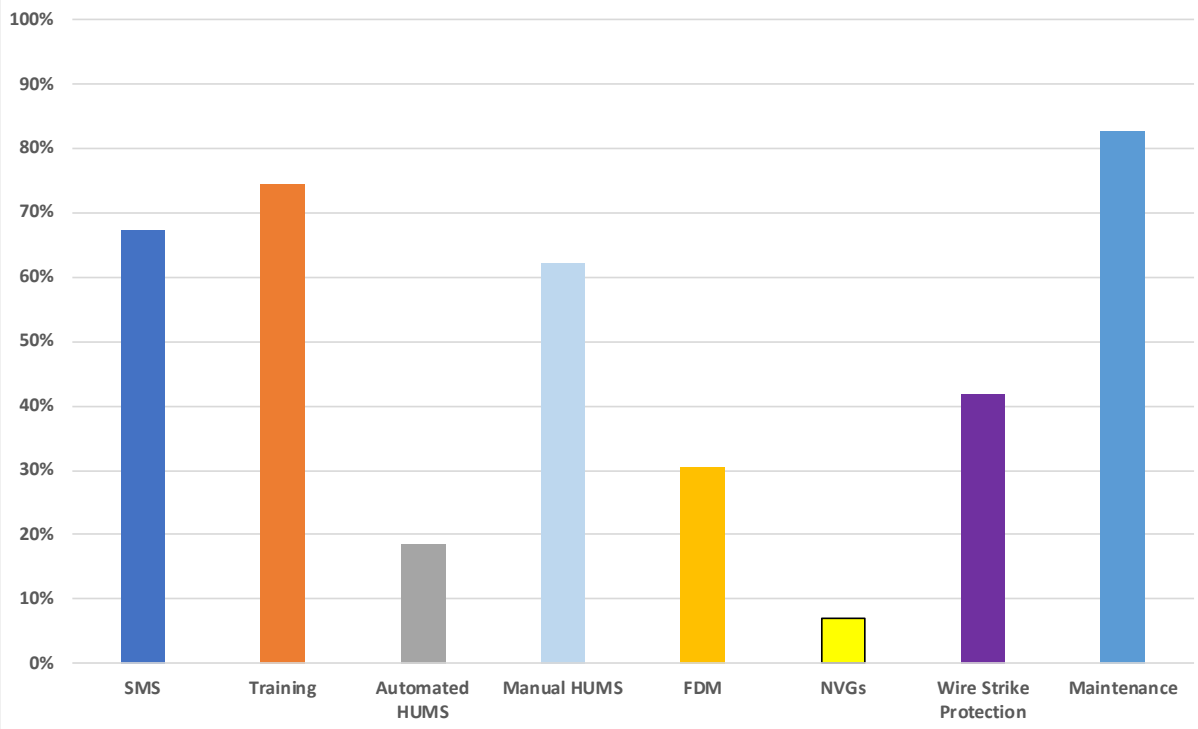
### **Use of IHSF's Key Recommendations by Helicopter Use**



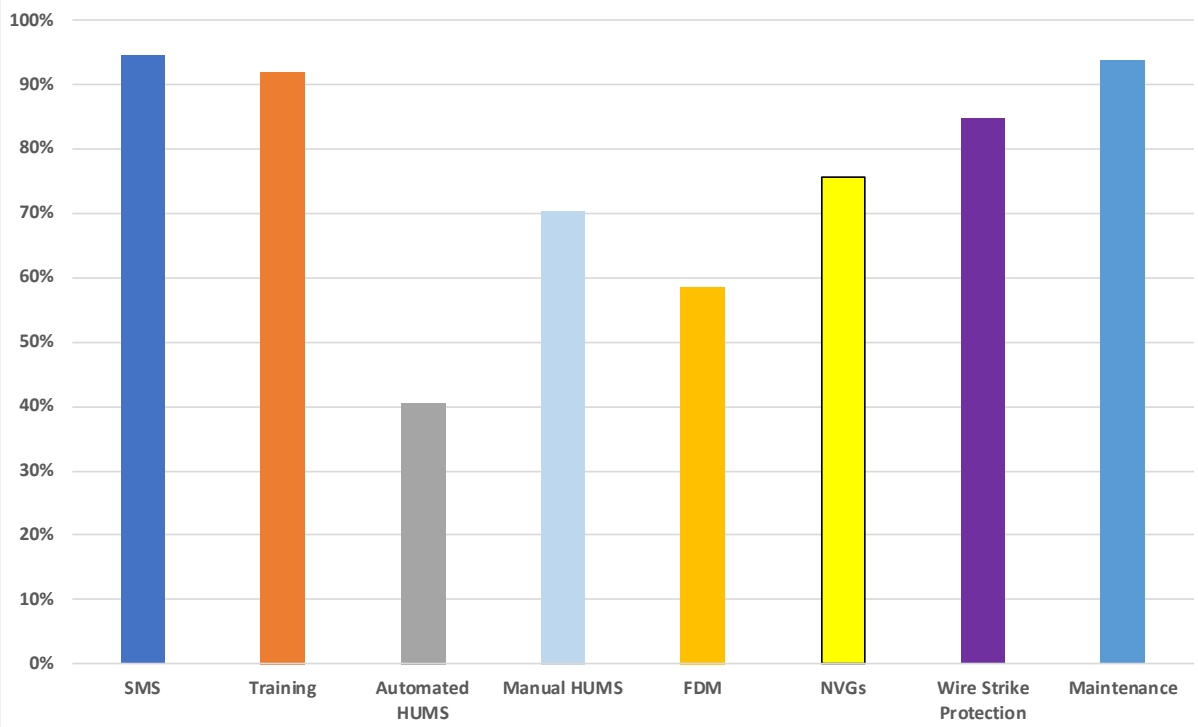


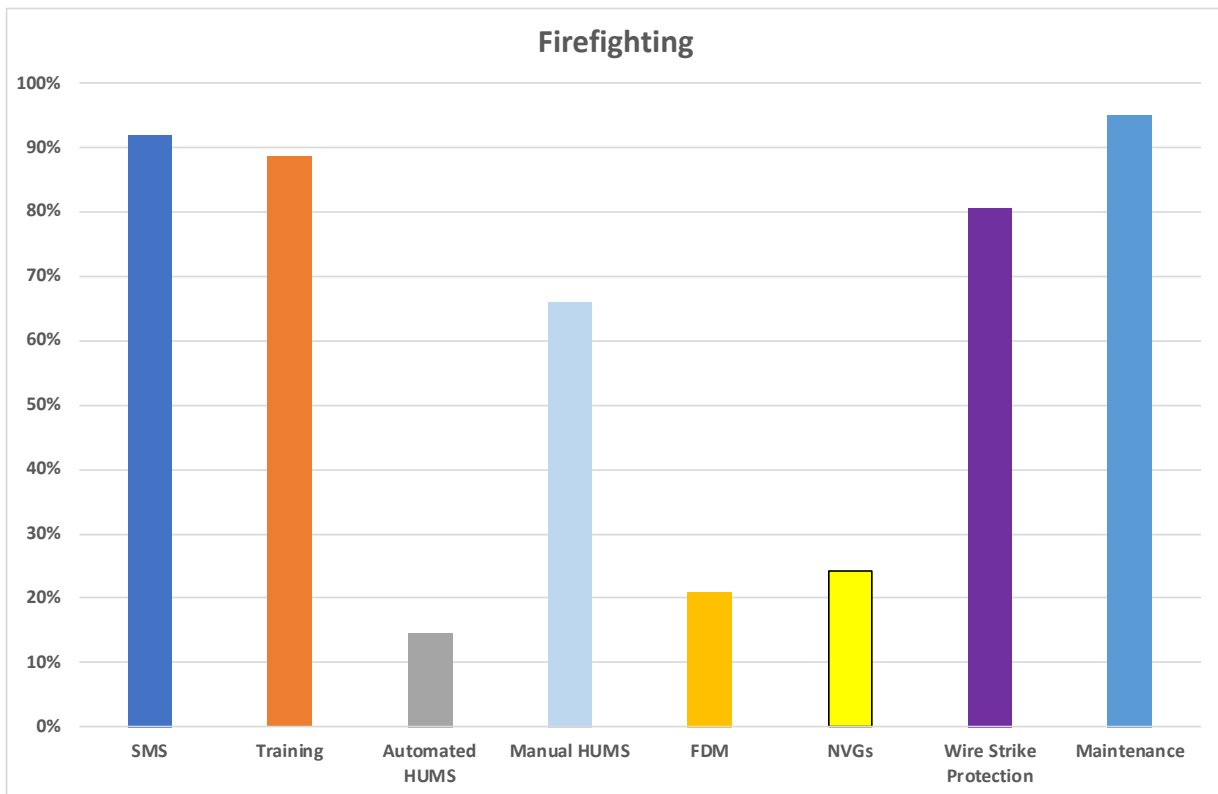
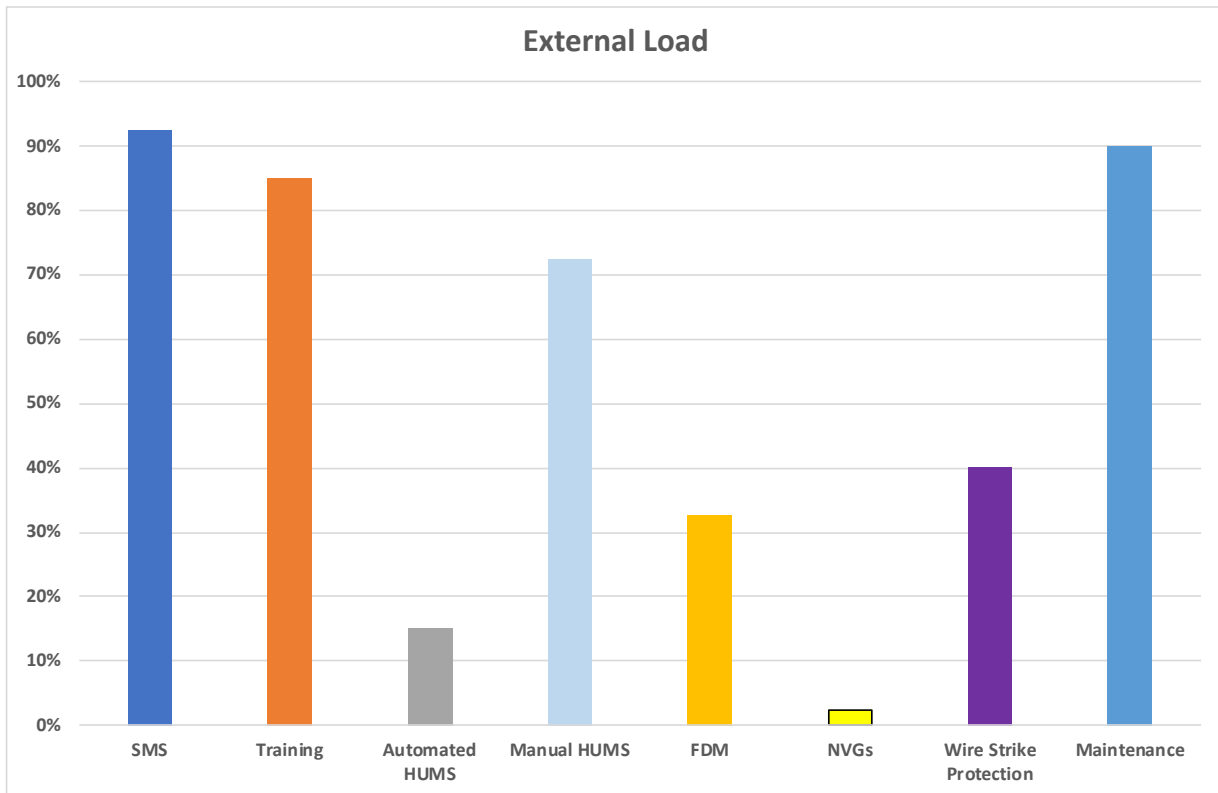


### Business Aviation

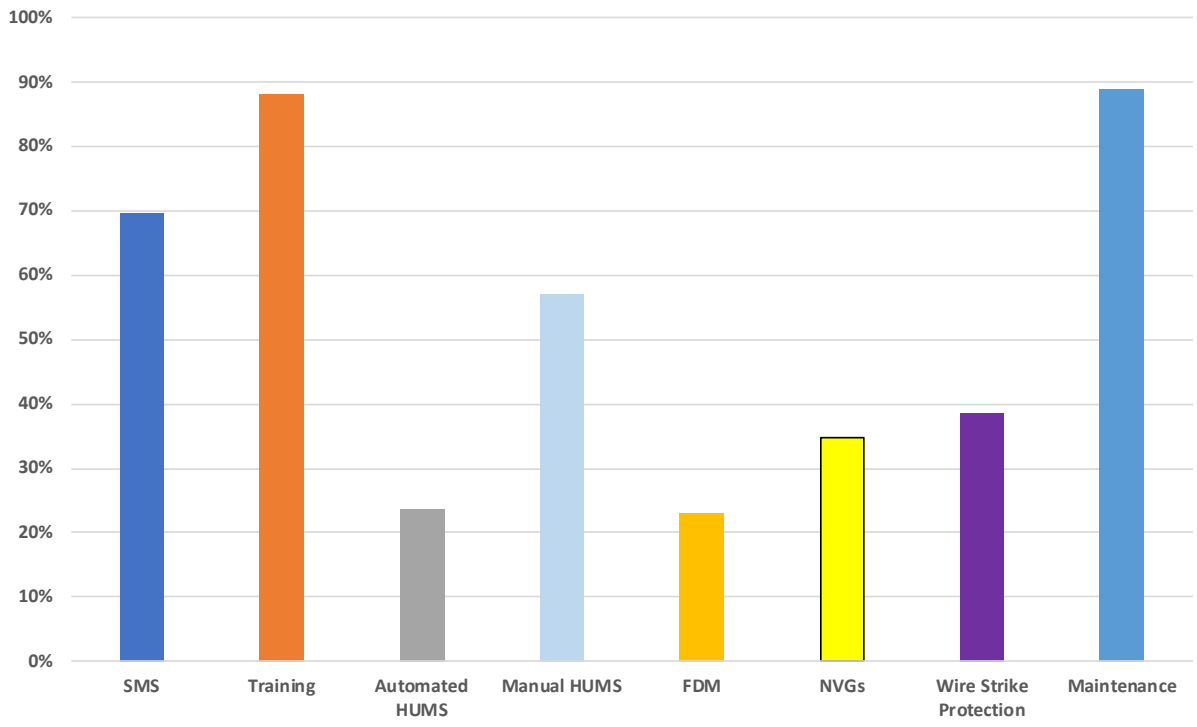


### Emergency Medical Services

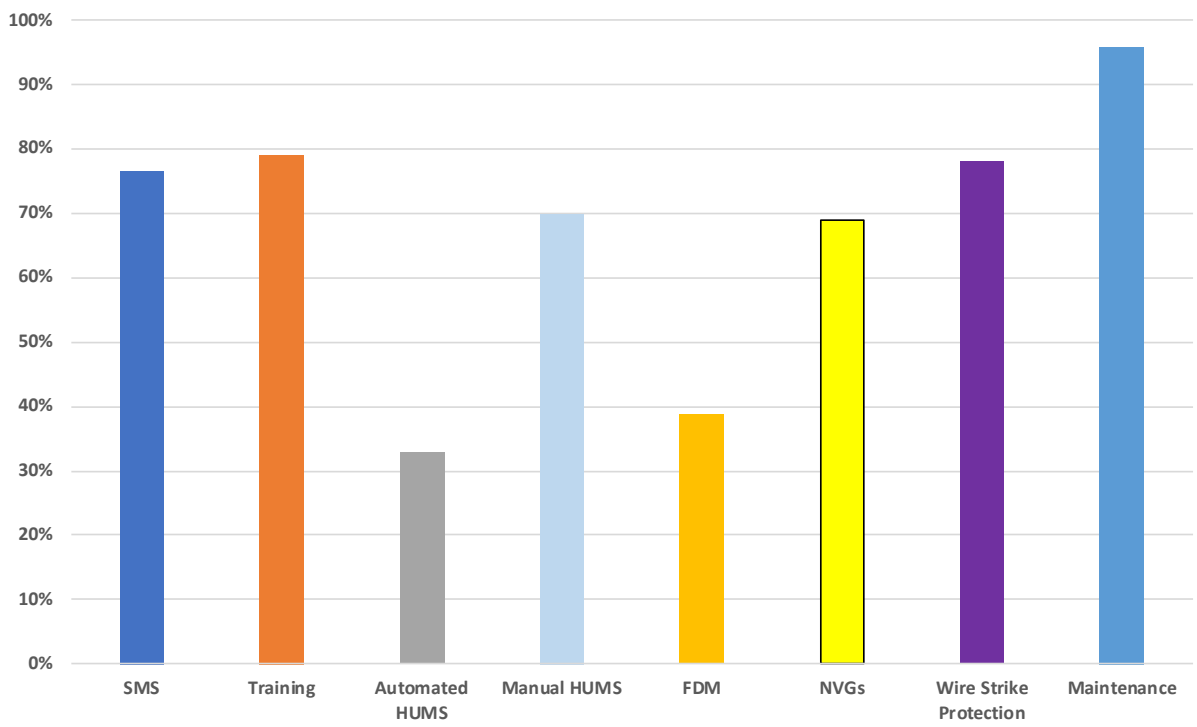


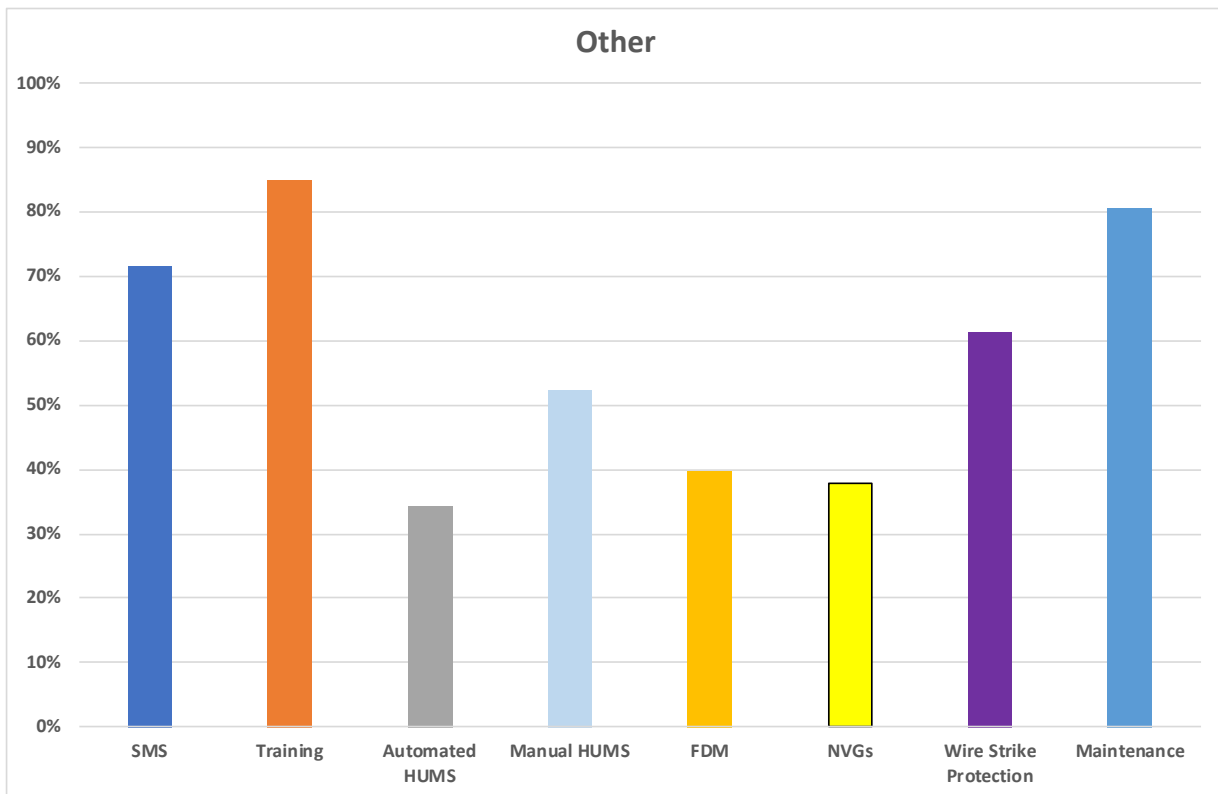
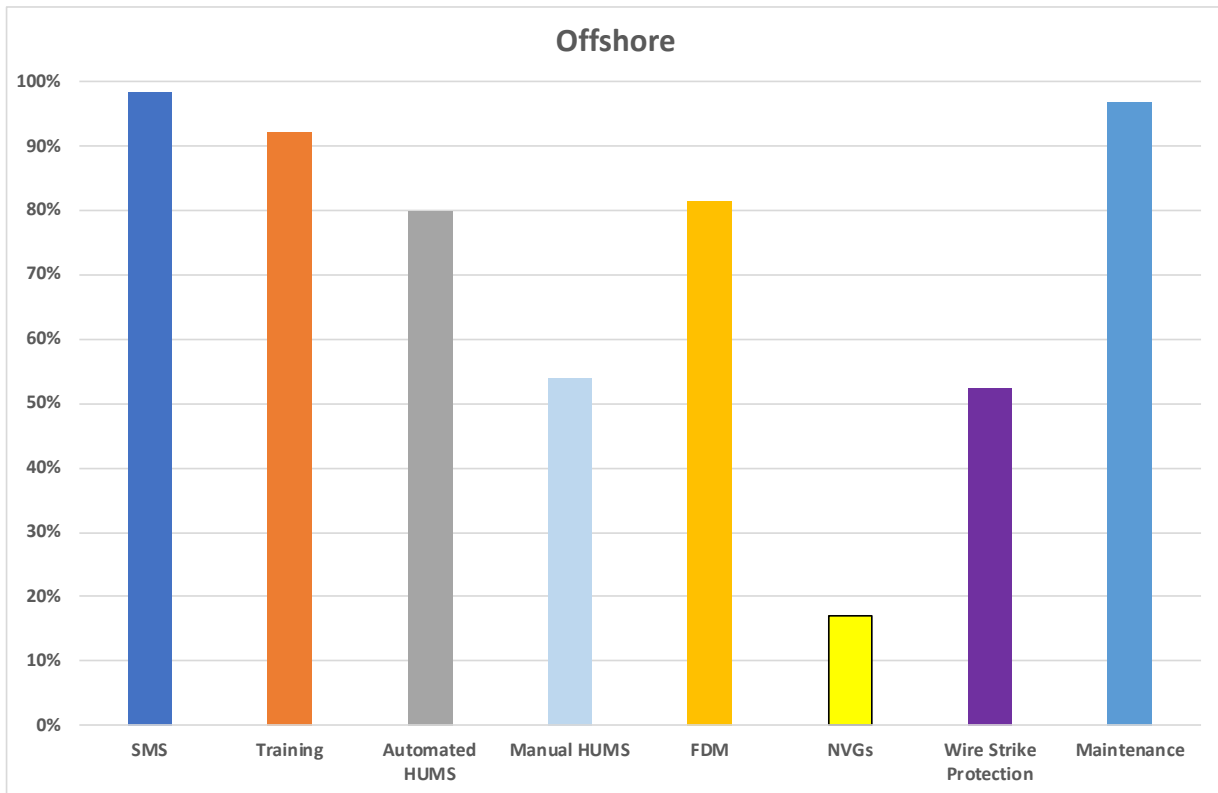


### Instruction/Training

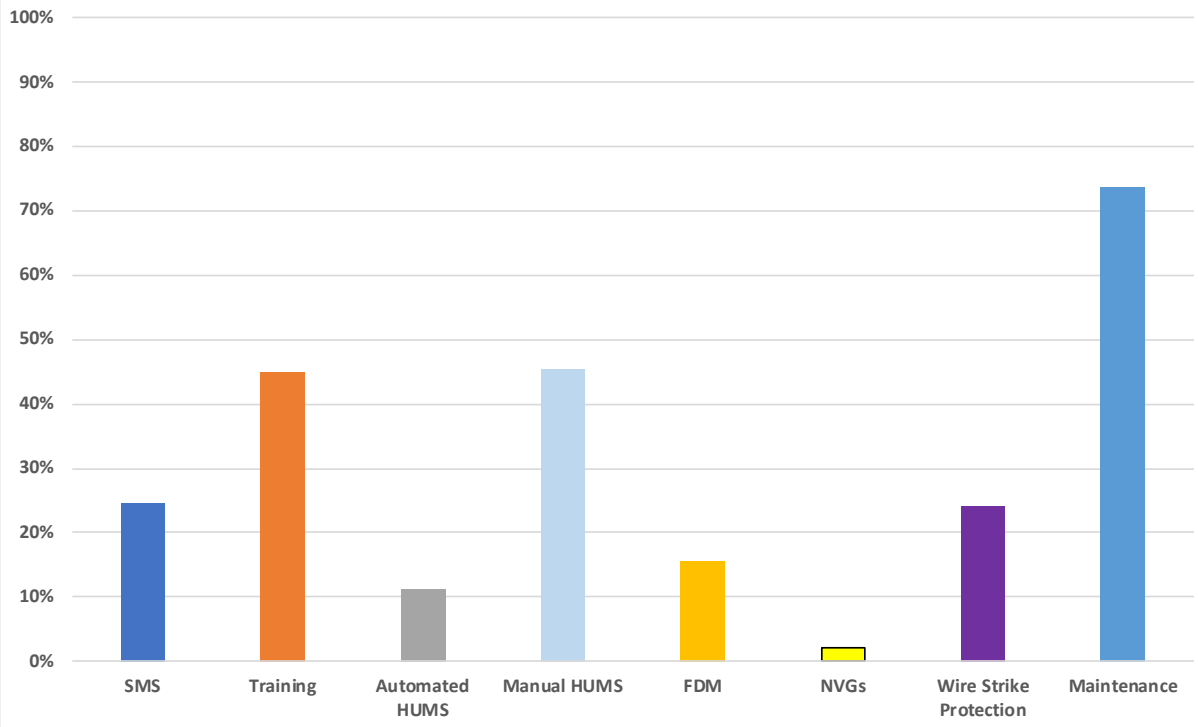


### Law Enforcement





### Personal/Private



### TV/Radio News Gathering

